PACKAGE engineering

Taking the guesswork from friction testing

How to measure accurately and simply the coefficient of friction in solving the increasing problems of slipperiness due to improvements of surfaces of folding cartons and fibre boxes. (See page 31)

Food packaging for radiation preservation

What five research experts learned from using different flexible materials as can liners when packaging gamma-irradiated fresh fruits and vegetables, including effects on flavor and shelf life. (See page 40)

New vistas of corrugated box performance

The Forest Products Laboratory launches a series of technical notes on structural and functional design of corrugated boxes and components—geared to better "tailoring" of performance to needs. (See pages 60 and 76)

Complete table of contents on page 2

FEBRUARY 1959

VOLUME 4 • NUMBER 2

BULK RATE
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Wright Solves The Problem . . .

Contract Packager Needed Versatile, Precise Weigher

The Wright Junior Weigher again proved its versatility and accuracy by meeting the Fresh-Pak company's unusual requirements.

Here's the story as told by the customer: "In the course of a day we may package as many as 7 or 8 different items at precise weights varying from 3 oz. to 16 oz. or more. We have found the Jr. Weigher to be efficient in each operation."

FAr Rockaway 7-0600

fresh-pak . . *Manufacturing Company*

3432 EDGEMERE AVENUE
FAR ROCKAWAY 91, NEW YORK

Contract Packaging

Oct. 18, 1958

Wright Machinery Co.
796 Bergen Blvd.
Ridgefield, N. J.

Att: Mr. I. P. Ritschel

Dear Sir:

We have been operating a Wright Jr. Weigher here at Fresh-Pak for more than 10 months and we find that it satisfactorily lives up to our demands.

Our business provides a unique test for a packaging machine: We are contract packers and handle a variety of nuts, candies (both wrapped and unwrapped), dried beans, etc. We have found the Jr. Weigher to be efficient in each type of operation. In the course of a day, we may package as many as 7 or 8 different items at precise weights, varying from 3 oz. to 16 oz. and more. Therefore, time and ease of "changeover" is a factor of great importance to us. We find that with the Jr. Weigher it takes a minimum of time to adjust for different weights.

Not only have we found it efficient to work with the Wright Jr. Weigher, we have also found the personnel of your company very cooperative. From the men who installed the machine, to the engineer who adjusted it, as well as the sales department, their aim was to see to it that we were well pleased . . . and so we are.

Sincerely yours,

FRESH-PAK MFG. CO.

Jesse Ginsberg

Jesse Ginsberg

jg/b

Fresh-Pak's President Jesse Ginsberg, left, and Wright's Bob Rullo examine one of the Junior Weigher's unique change-over features.

WRIGHT MACHINERY COMPANY
DIVISION OF SPERRY RAND CORPORATION
DURHAM, NORTH CAROLINA

DISTRICT OFFICES: Ridgefield, N. J., LaGrange, Ill., Dallas, Texas, San Francisco, Calif., Durham, N. C.

CANADA: Sperry Gyroscope Ottawa Limited, Ottawa, Ontario, Canada

Wright Machinery Company PE
Division of Sperry Rand Corporation
Durham, North Carolina

Please send me literature and price-delivery information on your Wright Junior Weigher.

Name_____

Company_____

Address_____

City_____ State_____

Our Products_____

For more information circle No. 201 on Reader Service Card

Aluminum Foil Packaging–Light Barrier and Vitamin Protector

Report No. 19 of a Series by Reynolds Metals Company

An early report, No. 6 of this series, presented the advantages of aluminum foil as a light barrier particularly in regard to prevention of oxidative rancidity in products containing oil or fat. Numerous experiments were cited showing the catalytic effect of light as a major contributor to this common form of food deterioration. Report No. 14 dealt with the effects of light on vitamins in enriched, partially baked rolls.

Milk—a Dramatic Example

Of the great number of food products affected adversely by light, however, milk is perhaps the most dramatic example.* Light acts upon milk principally in the following ways: (1) by catalyzing the oxidation of ascorbic acid, (2) by causing the destruction of Riboflavin and Vitamin A, and (3) by stimulating the development of oxidized and activated flavors.

A series of tests conducted for Reynolds Metals Company by the Wisconsin Alumni Research Foundation compared various types of milk in four types of containers: clear glass, brown glass, waxed carton and aluminum foil carton. The milk thus packaged was exposed to both fluorescent light and sunlight. The fluorescent lighting was designed to simulate conditions in a supermarket —the product being placed in an open top refrigerated display case maintained at 50° F., with the lights developing an intensity of about 100 foot candles. Tests under fluorescent light were made prior to exposure, then after 3 and 10 days. Those using sunlight were made prior to exposure, then after 30 and 120 minutes.

Summary of Test Results

Summarizing the separate tests measuring vitamin content before and after the indicated light exposures, the results were as follows. For Riboflavin (Vitamin B_2), no losses of nutritional significance under fluorescent light, but substantial losses in sunlight for milk stored in clear glass and waxed cartons — aluminum foil and brown glass affording excellent protection. For reduced Ascorbic Acid (Vitamin C), much slower rate of loss for milk stored in aluminum foil and brown glass —the pattern appearing similar in fluorescent and sunlight. For Vitamin A, only the milk in clear glass containers showed losses under fluorescent light; in sunlight these losses were very rapid and there was also some loss in waxed cartons.

Tests for Flavor Scores

Tests for flavor scores produced findings of special interest, since there appears to be a correlation between the formation of oxidized and hay-like flavors in milk and the loss of Ascorbic Acid. In the Table shown here, all scores of 35 or under represent a flavor defect — a definite oxidized flavor in whole milk and a pronounced hay-like flavor in skim milk. Here even brown glass failed to retard materially the flavor change. Only the aluminum foil carton proved effective under fluorescent light. And the results in direct sunlight were almost identical.

Manufacturers concerned with vitamin retention, or with other effects of light, such as oxidative rancidity, are invited to call the nearest Reynolds sales office. Or write to **Reynolds Metals Company**, Richmond 18, Virginia.

*Remainder of this report summarizes findings by the Wisconsin Alumni Research Foundation, as set forth in an article entitled "The Effects of Light on Homogenized Whole Milk and Some Fortified Milk Products", by J. J. Birdsall, L. J. Teply, P. H. Derse, in *Food Technology*, Dec., 1958, Vol. 12, No. 12, Page 670.

FLAVOR SCORES OF FOUR TYPES OF MILK STORED UNDER FLUORESCENT LIGHTS AT 50° F.

Package	Homogenized Whole Milk			Vitamin and Mineral Fortified Whole Milk			Vitamins A and D Fortified Skim Milk			Multivitamin Fortified Skim Milk		
	0	3	10	0	3	10	0	3	10	0	3	10
Clear Glass	39	33	33	38.5	33	33	38.5	33	33	38.5	37	33
Brown Glass	39	34.5	34	38.5	37	34	38.5	34	33	38.5	37.5	33
Waxed Paper Carton	39	35	34	38.5	33	33	38.5	36	33	38.5	37	33
Foil Laminated Carton	39	38	38	38.5	38	38	38.5	38	37	38.5	37	37.5

Watch Reynolds new TV shows "Walt Disney Presents" and "All Star Golf" every week on ABC-TV.

© 1959 by Reynolds Metals Company

For your calendar

February 10. Packaging Institute Professional Members Special Session, Hotel Statler, New York. Contact: Mr. Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, New York. *Telephone: Murray Hill 7-8875.*

February 20-23. 52nd Annual Exhibit of the Canning Machinery and Supplies Association, Conrad Hilton Hotel, Chicago. Contact: Mr. W. D. Lewis, Secretary-Treasurer, Canning Machinery & Supplies Association, 4630 Montgomery Avenue, Washington 14, D.C. *Telephone: Oliver 6-6979.*

February 21-24. 52nd Annual Convention of the National Canners Association, Conrad Hilton Hotel, Chicago. Contact: Mr. Nelson H. Budd, National Canners Association, 1133 20th Street, N.W., Washington 6, D. C. *Telephone: Executive 3-7030.*

March 31-April 1-2. Annual meeting of the Research & Development Associates, Hotel Statler, Washington, D.C. Contact: Col. Rohland A. Isker, secretary, Research & Development Associates, Food and Container Institute, 1819 W. Pershing Road, Chicago 9, Illinois. *Telephone: Lafayette 3-5500, Ext. 4262.*

April 13-15. AMA National Packaging Conference, Palmer House, Chicago. Contact: Mr. John L. Wood, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

April 13-17. 28th AMA National Packaging Show, Chicago International Amphitheatre, Chicago, Illinois. Contact: Mr. John L. Wood, American Management Association, 1515 Broadway, New York 36, New York. *Telephone: Judson 6-8100.*

May 17-21. Annual meeting of the Institute of Food Technologists, Bellevue-Stratford Hotel, Philadelphia, Pa. Contact: Col. C. S. Lawrence, Institute of Food Technologists, 176 West Adams Street, Chicago 3, Illinois. *Telephone: Andover 3-6268.*

November 16-18. 21st Annual National Packaging Forum of Packaging Institute, Hotel Statler, New York, N. Y. Contact: Mr. Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, N.Y. *Telephone: Murray Hill 7-8875.*

Nov. 17-20. Packaging Machinery Manufacturers Institute Show, New York Coliseum, New York. Contact: Hanson & Shea, Inc., One Gateway Center, Pittsburgh 22, Pa. *Telephone: Atlantic 1-8552.*

FEBRUARY 1959 • VOLUME 4 • NUMBER 2

PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

Articles

31 You can build an accurate friction tester, by A. R. McManus, chemical laboratory supervisor, and R. J. Rother, coatings development chemist, Gaylord Container Corporation
Taking a close look at carton and box slipperiness in developing a practical tester utilizing physical laws and principles of friction.

36 Polyurethane foam protects delicate precision instruments, by John T. Armbruster, industrial designer, Instrument Division, American Optical Company
Reviewing details and results of experience in "tailored" interior protection by foam—replacing handmade blocks in storage cases.

40 Packaging effects on the flavor and shelf life of gamma-irradiated fresh fruits and vegetables, by D. K. Salunkhe, L. H. Pollard, R. K. Gerber, E. B. Wilcox, College of Agriculture, Utah State University, and Morris Simon, Quartermaster Food and Container Institute
Results of using a variety of flexible materials as can liners in radiation preservation packaging—with test results and effects of flavor and shelf life.

53 We make one box do the work of four, by Jack Klecka, packaging engineer, A. B. Dick Company
Changing production line methods and can packing techniques to capitalize on structural package design geared to meeting current distributor and user needs.

56 "Assist frames" speed up skin packaging operation, by H. D. Lawrence, director of engineering, Dowst Manufacturing Company
How practical shortcuts reduce changeover time from 50 to 5 minutes when going from one size of skin packaging card to another.

60 FPL structural design work rests on 30 years' research, by Keith Q. Kellicutt, engineer, Forest Products Laboratory
Reviewing the history and development of research activities in corrugated boxes and components as the basis of its series of technical notes.

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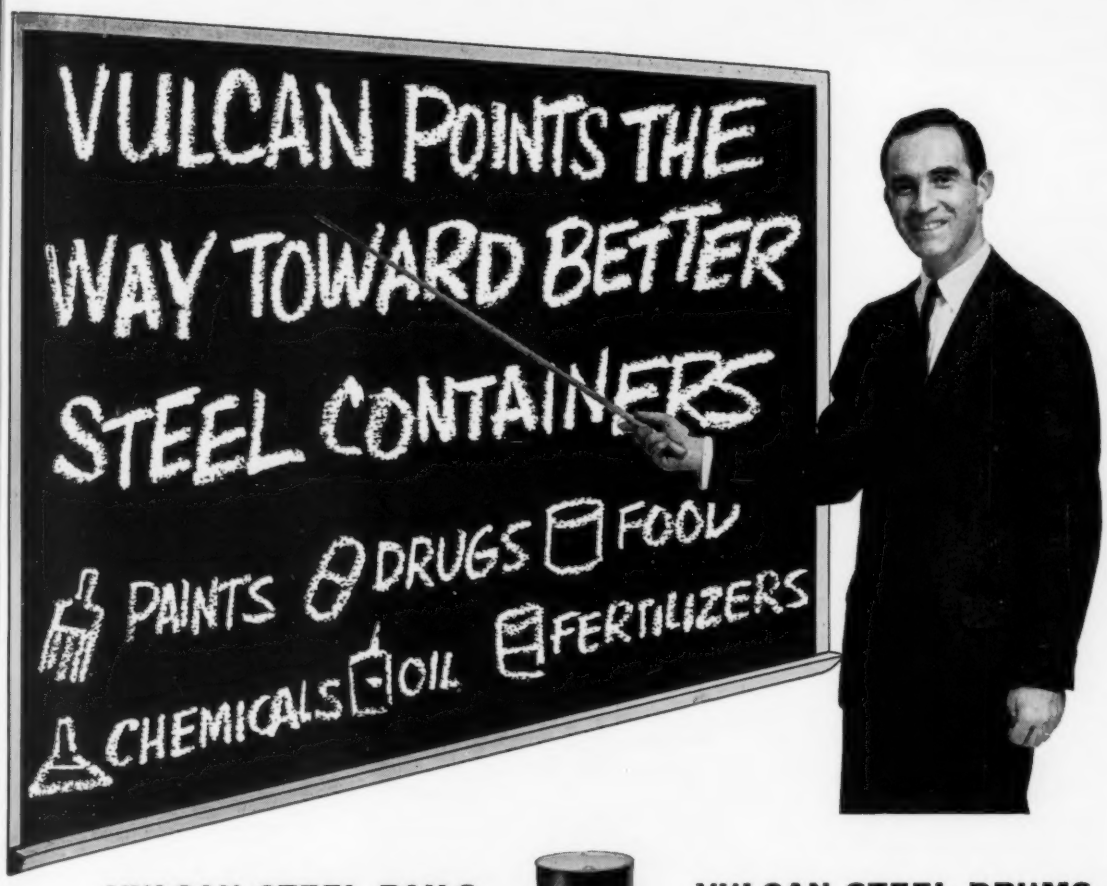
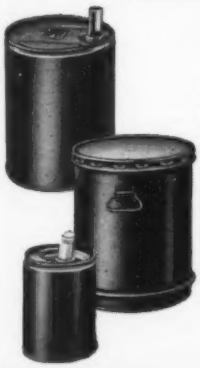
Reader Service Card inside back cover

Our December 1959 issue will carry a cumulative editorial index for the year listing our feature articles by subject, author, and other headings.



VULCAN STEEL PAILS



The manufacturer needing a small package for his requirements can choose exactly the right size and type from the complete Vulcan line of steel pails. Vulcan offers a choice of gauges in both lug cover and closed head types in sizes ranging from one to fifteen gallons.

VULCAN STEEL DRUMS

These drums are the choice of leading manufacturers for the shipment and storage of liquids, plastics, crystals, semi-solids, and powders. All standard drum gauges are available . . . check with us regarding closures and accessories.

CHECK WITH VULCAN ON THESE TOO!

GREASE DRUMS . . . Available in both 120 and 100 pound capacities.

15 GALLON DRUMS . . . A new addition to the Vulcan line—available in open head and closed head types.

VULCAN

Vulcan offers real flexibility with a choice of linings, closures, accessories, and various painting and decorating services. Mail coupon for full information and the name of your Vulcan representative.

VULCAN CONTAINERS INC., Bellwood, Illinois

Gentlemen: I am interested in: PE-29

☐ Pails, in the following sizes_____

☐ Hi-Bake protective linings for (product)_____

☐ 55 gallon drums.

Please get this information to

Name_____

Company_____

Address_____

City_____ Zone____ State_____

For more information circle No. 203 on Reader Service Card

A note from the Publisher

A year ago Packaging Institute announced a new class of membership in PI—professional membership.

So far this group has done nothing as a group, but in December it was announced there will be a Professional Members' Special Session at the Hotel Statler in New York on February 10.

On checking the directory to see how this type of membership was progressing, I found it a small group *numerically only,* since it includes some of America's most outstanding and best known packaging men.

In the current directory there are 160 professional members listed. Of these 73 are from package using companies, 63 from supplier companies, 11 editors, educators or consultants, and 2 miscellaneous—creating a good balance and not being dominated by any one interest.

However at this point, only two industrial companies, General Electric and Westinghouse, are represented, and industrial men could profit greatly by talking with men engaged in the packaging of consumer products. While their sales problems may be greatly different, their protective and mechanical packaging problems are similar. Packaging Institute as an organization would be stronger with more industrial members, and the industrial men would certainly profit by more contact with consumer goods packagers.

While in the past Packaging Institute sessions have consisted of giving prepared papers, the forthcoming professional session will be different. William Enzie, manager of the Birds Eye Frozen Food Division of General Foods, who is moderator of the first professional session of 1959, has prepared a day of questions and answers on various aspects of frozen food packaging. Other groups of professional members with different interests will meet later in the year.

Based on experience, it has always seemed that the greatest convention and industry meeting benefits develop from the spontaneous conversations and observations that take place after the speech is over. Of course you can always read the speeches after they are published, but the priceless "off-the-cuff" conversations you can get only by attending in person.

Here is a one-day session devoted to "off-the-cuff" questions and answers. You can be sure the program will be of particular interest to you if this phase of packaging is your concern, as the subjects covered will be developed by those in attendance.

It is more important than ever today to keep up with the rapidly changing and expanding packaging field. These professional membership sessions promise to be another very worthwhile way of accomplishing this end.

Angus J. Ray

Publisher

PACKAGE engineering®

AN ANGUS J. RAY PUBLICATION

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BPA

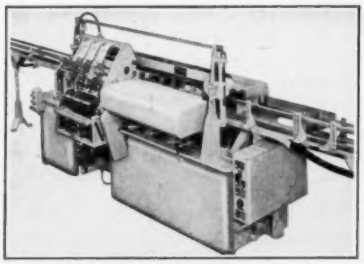
For more information wr
direct to manufacture

What does it cost to label... LATER ?

Confusing ?.. not to a lot of food packers. At the peak of the season their production requirements far exceed the capacity of their labeling equipment. As a result they 'pack off' excess units in cases . . . send them to the warehouse.

Later, when things calm down, they retrieve these unlabeled containers from storage . . . uncase them . . . label each bottle . . . recase and ship. It all adds up to extra handling, *costly and unnecessary.*

If 'peak and valley' work loads are a challenge to your present labeling equipment, switch over to the World Super CM. This is a continuous motion machine which labels any ketchup container at speeds up to 210 bottles per minute. Ask your World Sales Engineer about the Super CM's "multi-label application," *too!*

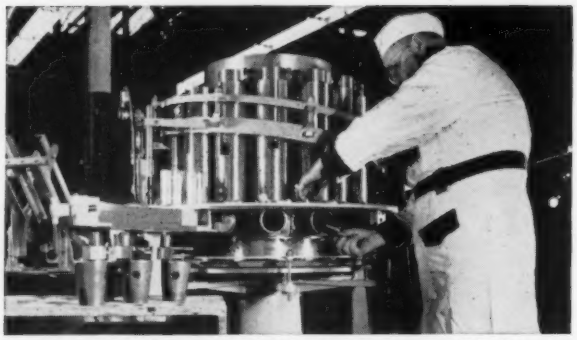


SUPER CM LABELER

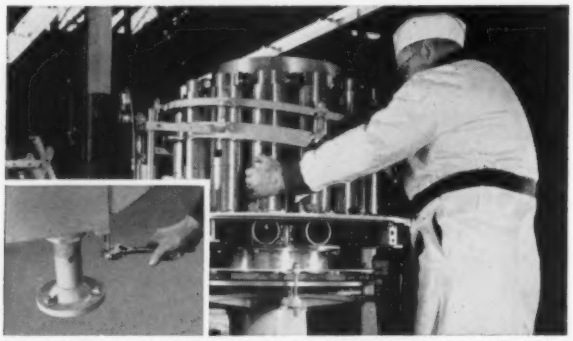
WORLD LABELERS

ECONOMIC MACHINERY COMPANY • WORCESTER 3, MASS. / Division of Geo. J. Meyer Manufacturing Company

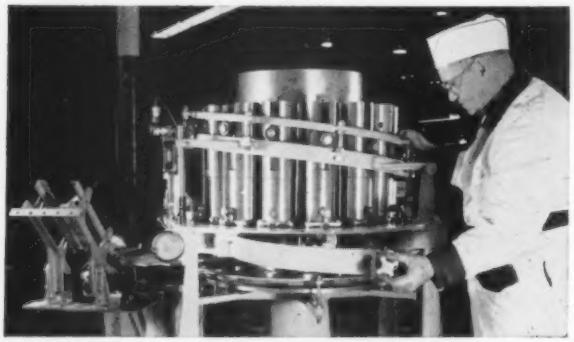
IN ONE HOUR



Operator saves 80% in time with height changes on *new* RP-214, since bowl and cam ring stay put. First, he raises pistons, then removes valve plugs.



Next, operator turns filler bowl to new height. Spacer ring on *new* RP-214 is adjusted by rotating bowl. Piston and valve cam ring are set by adjustable support leg screws (see inset photo).



Finally, valve plugs are replaced and pistons lowered into position. Operator closes valve cam ring access door. He then starts the machine!

Change can height on New RP-214 Filler

You can save 80% on height change-over time with *new* RP-214. It requires just *one hour*.

The *new* RP-214 retains all those features you find only on Pfaudler fillers: ±1/10 oz. accuracy at speeds up to 400 cans a minute.

No container—no fill mechanism; air operated for faster operation and less maintenance. One man cleans machine in just 30 minutes. Only four primary wearing parts, all inexpensive and easy to replace.

Write for Bulletin 973 and *see it at the '59 Canners Show, Booth 34.*

75 YEARS CREATING FOR TOMORROW Pfaudler

THE PFAUDLER CO.

a division of PFAUDLER PERMUTIT INC.
Dept. PE-29, Rochester 3, N. Y.

Letters to PACKAGE engineering

Re: Optimum placement of cushioning

Gentlemen:

The article *How to Locate Optimum Placement of Cushioning for Liquids in Glass Containers* appearing in the October, November, and December issues of *Package Engineering* will lead to a great amount of confusion in the packaging of liquors unless someone clarifies, first, the true chronological sequence of events and second, the actual liquor packages now recognized by the railroads. The first is confused in the article and the second is erroneous in several points. It should be pointed out that the information in the article is not recent and the package changes reported are not recent. Several factors in the article such as the packages mentioned, the methods of cushion testing used, and the age of the electronic equipment shown in the photographs, date the work as being about 1950.

It is indicated on pages 55 and 56 of the December issue that the package system "Code C (AVA)" (200 lb. test single-wall box and test single-wall partitions) was selected by the distiller for ⅕ quart packaging in preference to "Code E" (200 lb. test single-wall box and double-wall partitions); that package system "Code C (AVA)" was approved by the rail freight classification committees for ⅕ quart liquors; and that the package was in general use with great savings being realized. The following letter by L. W. North, Member, Official Classification Committee, will help clarify the above erroneous statements contained in the article:

OFFICIAL CLASSIFICATION COMMITTEE
One Park Avenue at 33rd Street
New York 16, N. Y.
November 26, 1958

Mr. John G. Turk
Packaging Research Laboratory
Glass Container Manufacturers Inst., Inc.
121 West South Street
Lansing, Michigan

Dear Mr. Turk:

Receipt is acknowledged of your letter of November 20.

It appears from our records that the alcoholic liquor specifications were amended to authorize double-wall corrugated partitions without liners in Supplement 1 to C.F.C. 18, effective July 15, 1948. This change was made on application of the Glass Container Manufacturers Institute and it appeared as Subject 31 of Docket 125.

Package 1039, authorized for alcoholic liquors, was established as a result of Subject 38, Docket 145, July, 1951, on application of Joseph E. Seagram & Sons, Inc., and became effective May 30, 1953.

Yours truly,
OFFICIAL CLASSIFICATION COMMITTEE
(signed) L. W. North
Member

1. In the light of this information it is apparent that the authorization to use double-wall corrugated partitions without liners for the ⅕ quart liquor package (essentially "Code E" of the article) was accomplished as a result of earlier work done by the Glass Container

New TAPEnology gives dust protection at 20 units a minute!

The oil filter cartridges shown above were packed in 4-unit cartons, safe from dust and other contamination *until the carton was opened.* Then the center cores began to accumulate dust and debris. Needed was a covering that would (1) go on easily (2) stay in place in storage (3) remove easily.

3M Customer Engineering Service, working with the manufacturer's engineers, devised the high-speed fully automatic tape applicator shown: as the filter cartridges come down an endless chain conveyor, two "SCOTCH" BRAND S-601 flat-surface applicators simultaneously apply short strips of printed "SCOTCH" BRAND Colored Paper Tape No. 256 over the core openings. Cores are safely, securely sealed at the rate of 1,200 units an hour for a cost of approximately .002¢ per unit.

What's your packaging problem? Chances are, "3M-MATIC" Taping and dispensing methods can help you solve it. Ask your nearest "SCOTCH" BRAND Tape Distributor for complete information, or write: 3M Co., St. Paul 6, Minn., Dept. RZ-29.

When tape costs so little, why take less than "SCOTCH" Brand?

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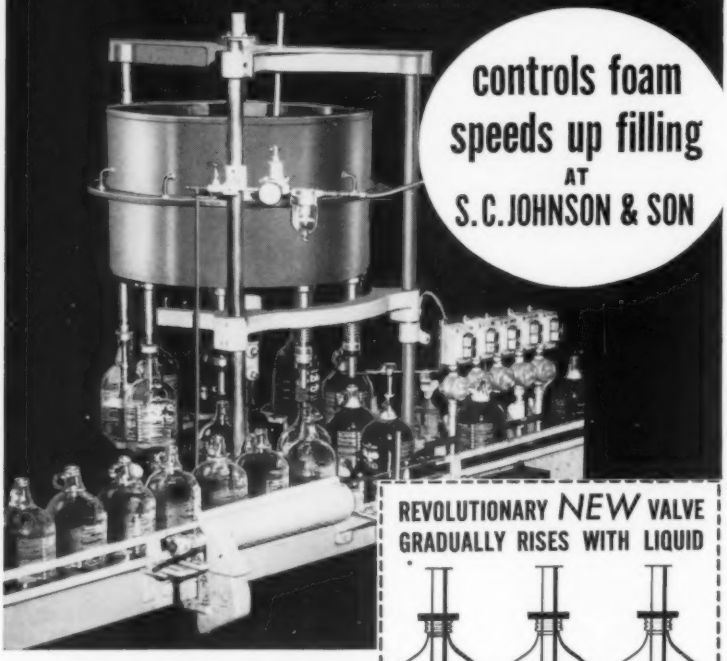
"SCOTCH" is a registered trademark for the pressure-sensitive adhesive tapes of 3M Co., St. Paul 6, Minn. Export: 99 Park Ave., New York 16. Canada: London, Ontario.

MINNESOTA MINING AND MANUFACTURING COMPANY
. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

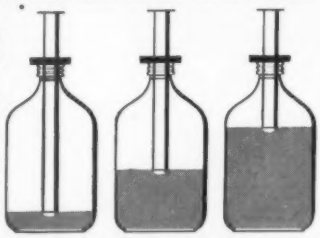
NEW HORIX
UNDER SURFACE FILLER



controls foam
speeds up filling
AT
S.C.JOHNSON & SON

Illustration shows Horix Under-Surface Filler Model HB-BF-9 operating at S. C. Johnson & Son plant. They are filling gallon jugs at 13 CPM—Gallon "F" style cans at 16 to 18 CPM —and ½ Gallon "F" style cans at 30 CPM.

REVOLUTIONARY NEW VALVE
GRADUALLY RISES WITH LIQUID



At the start of fill, double action filling tube drops to bottom of container, and then withdraws gradually so that the entering liquid is always below the surface of the liquid. This operation minimizes formation of foam and incorporation of air in product.

Here is one of the most important developments in liquid filling in recent years. With this new Horix filler, the formation of foam during filling is kept to the absolute minimum.

S. C. Johnson & Son reports they are handling highly foamy products with significantly improved production and with greater accuracy than with previous filling methods.

This new Horix Under-Surface Filler combines the best features of both top and bottom filling. Fill height is exact since only the tip of the filling tube extends below the surface level of the liquid being filled. Speed of operation is maximum due to the prevention of foam and trapped air bubbles.

Write for complete information.

HORIX
MANUFACTURING CO. • PITTSBURGH 4, PA.

Manufacturers Institute and individual member companies of that Institute. This package proposed by the Glass Container Manufacturers Institute, adapted by the railroads in 1948, and incorporating double-wall partitions, is the package that has been almost universally adopted by the distilling industry for the shipment of ⅘ quart liquors. This package was in use by many distillers as early as 1948 and much prior to the time that subject 38, Docket 145, (July, 1951), was proposed. The distilling industry, and the distiller mentioned in the article, are currently using this package successfully for ⅘ quart liquors. As correctly indicated in Fig. 4 (see "Code E" and "Code C") of the December issue this package, developed by the Glass Containers Manufacturers Institute, gave much better performance than any of the others, and in addition was considerably less costly than any other package for ⅘ quart liquors then in use.

2. Packaging system "Code C (AVA)", contrary to the article, has never been approved by the rail freight classification committees for use with ⅘ quart liquors. It is not being used, as was incorrectly stated in the article, by the distiller mentioned or by any other distillers shipping ⅘ quart liquors in accordance with railroad regulations.

3. Packaging system "Code C (AVA)" does resemble Railroad Package Description 1039 (though a bottom pad is required for Package 1039 and the flute size is not limited to A flute) which was approved for *"bottles not exceeding one pint capacity."* The effective date of this package was May 30, 1953. Package 1039, for pints and less, came about after an extensive shipping survey conducted cooperatively by Joseph E. Seagram and Sons, Inc., Container Corporation of America, and Glass Container Manufacturers Institute.

Incidentally, readers of *Package Engineering* might be interested in the fact that a new half-pint package for liquors will become effective as Package Description No. 1194, January 20, 1959, as a result of recent research, shipping, and application to the rail freight classification committees on the part of Hiram Walker and Sons and the Package Committee of the Glass Container Manufacturers Institute.

John G. Turk, Director
Packaging Research Laboratory
Glass Container Manufacturers Institute, Inc.
Lansing, Michigan

GCMI misses the point of the article. We offered it as an engineering study, a method of problem-solving. Apparently the many readers who requested extra copies saw the article as a working tool and in no way a report of anything claimed as "new." But the authors do regret their error in suggesting that Code C (AVA) was approved for ⅘ qt. Incidentally, the authors note that their work predates 1948.

For more information circle No. 206 on Reader Service Card
For more information circle No. 207 on Card

New container made of MARLEX* is safe for powerful acid that etches glass!

Mallinckrodt Chemical Works are now packaging their Hydrofluoric Acid in new 1-pound and 10-pound patented functional containers with controlled delivery (drop or flow action) closures molded from MARLEX linear polyethylene.

MARLEX is resistant to this highly corrosive acid, which is used to etch glass, treat ceramics, ferment yeast, etc. MARLEX makes possible these new, handy and functional containers—ideal for laboratory use.

The labels are printed directly on the bottles by silk-screen process using a special indicator ink that turns from blue to orange if liquid HF is accidentally spilled on it. The liquid level is visible at all times through the translucent MARLEX container walls.

Unlike conventional polyethylene, MARLEX is extra strong and rigid. Whether your container holds one ounce or 50 gallons, MARLEX will do the job and do it well.

MARLEX containers are impermeable to most liquids—offering packagers maximum shelf life at a minimum price. You can reduce shipping costs considerably by switching to MARLEX containers, since they are lightweight and unbreakable.

This container was molded by PLAX from MARLEX. Other MARLEX containers molded by PLAX are the Davol "Feed-Rite" nursing bottle and the new jar for Breck Banish shampoo.

MARLEX is a trademark for Phillips family of olefin polymers.

PHILLIPS CHEMICAL COMPANY, Bartlesville, Oklahoma, A Subsidiary of Phillips Petroleum Company

PLASTICS SALES OFFICES

NEW ENGLAND	NEW YORK	AKRON	CHICAGO	WESTERN	SOUTHERN
322 Waterman Avenue	80 Broadway, Suite 4300	318 Water Street	111 S. York Street	317 N. Lake Ave.	6010 Sherry Lane
East Providence 14, R.I.	New York 5, N. Y.	Akron 8, Ohio	Elmhurst, Ill.	Pasadena, Calif.	Dallas, Texas
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EXPORT: 80 Broadway, Suite 4300, New York 5, N.Y.

MARLEX®
Phillips 66
A PHILLIPS 66 PLASTIC

The PULSE / of packaging

Trends to watch:

Application of starch made from a corn known as amylomaize will provide a water soluble transparent film wrapping material for frozen foods, meats, and other edible products, according to **National Starch Products, Inc.**, and **American Maize-Products Co.** Currently starch from the new corn has 55% amylose content and is similar to cellulose, has "excellent" film forming and "high" film strength properties, according to its developers. Although they point out the film is made from corn and hence completely digestible when dissolved, they also predict its use as a packaging material for water dispersible products such as detergents, insecticides, and industrial chemicals. **Bear Hybrid Corn Co.**, Decatur, Ill., and **U. S. Dept. of Agriculture Northern Research Laboratory**, Peoria, Ill., launched the project, brought the new corn to National Starch and American Maize . . . Container producers look to larger volumes in 1959. **Owens-Illinois Glass Co.** says industry shipments of glass bottles and jars in 1959 will exceed the normal yearly increase with a more than 5% growth over the 20 billion units shipped in each of the past two years . . . Metal can output will increase about 2% to approximately 41.8 billion units, according to **American Can Co.** It predicts that 1959 metal can industry production will "about equal" the all-time record output of 1956 . . . Coming months should see interesting developments in bread wrapping. Advocates of waxed paper, cellophane, and polyethylene each cite advantages, note present drawbacks. We hear that a major problem is how to tear off a wrapper from the end of a loaf without destroying its value in protecting the bread after opening . . . Some 25 cities are now seeing quart-size paper milk containers coated by extrusion with polyethylene. Coated inside and out, cartons are heat-sealed at side, top, and bottom. Proponents say the coating eliminates "leakers" . . . Polyethylene people talk glowingly of the recent development of poly-coated corrugated board, say it might play an "important" role in the future growth of polyethylene. They predict the bulk shipment of foods will be the area of widest consumption for poly-coated corrugated board.

Packaging across the seas:

European Packaging Federation looks to development of a modulus system of standardizing packaging dimensions, based on an international pallet. The EPF modulus committee says Finland and Sweden have standardized packaging dimensions, Germany and Switzerland are working on standards. Eastern Europe socialist countries, too, looking at a modulus system point to a recent conference held in Warsaw, Poland, on standardizing dimensions . . . **St. Regis Paper Co.** has acquired a 50% stock interest in a centrally-controlled group of three container manufacturing companies in South Africa. These companies have a current annual sales volume of $5,000,000, produce corrugated containers, and folding and set-up boxes. St. Regis expects to furnish these South African plants liner board from its new mill at Jacksonville, Fla. . . . Aerosol experts traveling in Europe say problems of scarcity and expense have stimulated development of new methods which may represent improvements over those in the United States. They say England is setting the pace in European aerosol development—with France, Italy, Germany, and Holland not far behind.

More expansion for packaging:

Olin Mathieson Chemical Corp. recently opened its "Frostkraft" research center at West Monroe, La., and hopes to expand its position in the packaging field by developing new products and improving old ones . . . **St. Regis Paper Co.** has merged **Rhinelander Paper Co.** with it and established Rhinelander as a separate division of St. Regis. The new division will operate as before . . . **Markem Machine Co.**, Keene, N. H., has established three new divisions—to serve the food, chemical, and mechanical industries respectively . . . **Vanguard Products, Inc.**, has a new plant in Newark capable of producing 1,000 lb. of thermosetting polyester film an hour . . . **Eastman Chemical Products, Inc.**, has established a plastics sales development group and a technical information section, at Kingsport, Tenn., to correlate laboratory development work with industry needs . . . **Armstrong Cork Co.** is starting construction to increase productive capacity of its Dunkirk, Ind., glass plant by 50%. Besides new factory facilities, Armstrong is building a 140,000 sq. ft. warehouse . . . **Air-Formed Products Corp.**, Nashua, N. H., has been established for the contract blow molding of plastic containers and other hollow items. It will also produce blow molding machines and equipment . . . **Continental Can Co.** plans to build a 350-ton per day bleached sulfate paperboard and paper mill at Augusta, Ga. Continental does not currently produce its own bleached paperboard, although it converts bleached board purchased from outside sources. It will consume the bulk of the new mill's output . . . **The DuPont Company's** film department plans to increase its manufacturing capacity for "Mylar" polyester film by 30% by expanding its Circleville, O., plant. New facilities should start operating early in 1960 . . . Stockholders of **Standard Packaging Corp.** approved its acquisition of **Chemical Paper Manufacturing Corp.**, Holyoke, Mass., which will operate as Standard's "Chemical Fine Paper and Board Division." Standard acquired Chemical's assets for $2,600,000 cash . . . **Thilmany Pulp & Paper Co.**, Kaukauna, Wis., is adding 8,000 sq. ft. to its main office. This will permit concentration of sales and service offices . . . **American Can Co.** announces that operations of its two former subsidiaries, **Sun Tube Corp.** and **Bradley Container Corp.**, have been consolidated with the parent company. They will operate as the newly formed **Bradley-Sun Division of American Can** . . . **Stone Container Corp.** opened a 158,000 sq. ft. building (formerly a Packard Motor Car Co. plant) as new quarters for its Western Paper Box Div. . . . **Hoerner Boxes, Inc.**, announces plans to build sheet plants at Tupelo, Miss., and Springfield, Mo. Each building will have 40,000 sq. ft. of space . . . **Averil, Inc.**, Miami contract packager, has moved to a new and enlarged plant. It expects to enlarge these facilities in mid-1959 . . . **Paramount Packaging Corp.** has purchased the manufacturing supplies and inventories of the film printing and bag making division of **Arvey Corp.**, Chicago.

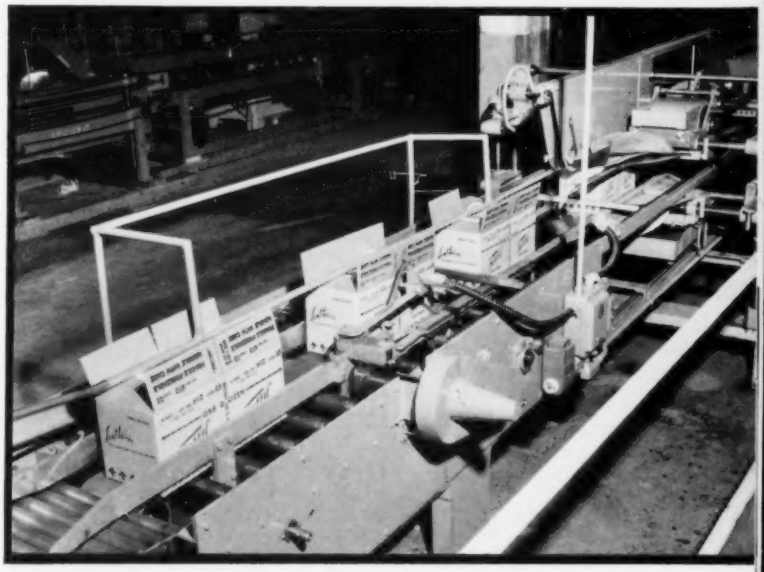
Packaging dollars and cents:

Morningstar-Paisley, Inc., reports net earnings for the first nine months of 1958 of $422,909, thus representing a 12% increase over the 1957 nine-month figure of $377,811 . . . **Pitney-Bowes, Inc.**, reports third quarter net earnings of $1,178,425, compared to $1,039,388 for the third quarter of 1957. Nine months' net earnings were $3,146,728,

Helene Curtis Seals Glamour into *TWEED*... Packomatic® T.M. Reg. U. S. Pat. Off. Seals *TWEED* in a Unique New Shipper

Packomatic's Model D Case Sealer is here adapted to sealing the new Helene Curtis "split-case shipper". A simple retainer rail was added to a standard Model D Gluer to hold top inner flaps in correct glue position until case traveled under top spine of glue unit. The 24-bottle shipping case, consists of two independent (fully flapped) 12 bottle cases joined at their centers. The case snaps in two to permit filling a 12-bottle order, without breakage hazards present in removing 12 bottles from a standard 24 bottle case.

Packomatic Model "D" Case Sealers with compression unit are readily adaptable to meet a wide range of shipping case and production line requirements—case sizes, contents, glue requirements, speeds, and plant layout. Packomatic models available for top sealing only or top and bottom sealing—fully automatically or semi-automatically. Let us show you the great savings a Packomatic Model D can effect for you. WRITE FOR DESCRIPTIVE LITERATURE.



Packomatic® T.M. Reg. U. S. Pat. Off.

J. L. FERGUSON CO. Joliet 1, Illinois

PACKOMATICS include the Bale Sealer • Case Sealers • Opener-Loaders • Case Imprinters • Telescoping Volumetric Fillers • Packer-Gluers • Semi-automatic or fully-automatic.

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compared to $2,949,572 for the same period last year . . . **The Crossett Company** reports earnings for the year ended November 30, 1958, of $3,955,000 compared to $4,335,000 for 1957. The drop in sales of kraft paper, lumber, and chemical products was only partially offset by an increase of 21% in sales of bleached food board.

What people are doing:

G. S. Mustin is now packaging research coordinator of Douglas Aircraft Co., Inc. He was formerly with Container Laboratories, Inc. . . . Goodyear Tire & Rubber Co. has named **A. L. Maillard** and **J. E. Taylor** converter sales representatives at New York and Chicago respectively . . . **Jack H. Conrad** is now sales promotion manager of the flexible packaging division of Pollock Paper Corp. . . . Fibreboard Paper Products Corp. has named **William C. Birdsey** project director—paperboard . . . New president of Growers Container Corp., subsidiary of St. Regis Paper Co., is **Frank L. Bennett** . . . Conapac Corp. has appointed **E. E. Miranda** vice president and **Charles F. Van Sweringen** manager of its Roto-Wrap Div. . . . **A. Mason DuPre, Jr.**, is now assistant to the administrator of the U. S. Department of Agriculture's Agricultural Research Service at Washington . . . **Neil McClarnan** is now Northern regional sales manager, multiwall bag sales division, of Crown Zellerbach Corp., headquartered in Chicago . . . **Robert R. Smith** is director of the new packaging sales division, and **Robert C. Myers** is director of the new industrial sales division, both of the DuPont Company's film department. DuPont has also named **Norman W. Kent** sales promotion manager of its "Freon" products division at Wilmington . . . Inland Container Corp. has named **Walter G. Koch** vice president of the company and a member of its board of directors . . . New general sales manager of the machine division of Hobbs Mfg. Co. is **Howard K. Lambert** . . . **Dr. George J. Foss** is now director of the package engineering and research laboratories of Anchor Hocking Glass Corp., Lancaster, Ohio . . . Tee-Pak, Inc., has named **E. E. Ellies** executive vice president . . . A. H. Wirz, Inc., has named **Daniel B. McAfee** vice president in charge of sales and **Robert Mahan**, vice president in charge of operations . . . New president of Texas Aerosols, Inc., Houston contract packager, is **E. L. Lorehn** . . . **Benjamin Karpowicz** is now president of Pak-Rapid, Inc., and **James Irvine** is its board chairman and treasurer . . . Pfaudler-Permutit, Inc., has named **Mercer Brugler** chairman of the board, and **Donald A. Gaudion** president. **C. Wendell Beck** is general manager of its Pfaudler Division . . . **Harold G. Kilb** has been appointed by the new chemical division of Bostrom Corp. to handle sales of its molded polyurethane foam products . . . **Donald K. Ballman**, director of sales, and **C. B. Branch**, manager of the plastics department, are now members of the board of directors of the Dow Chemical Company. New Western division manager of Dow is **Leland A. Doan** . . . **Bill B. Broach** is now sales manager of Standard Packaging Corp.'s Bradley & Gilbert and Gebhart Folding Box divisions, Louisville. **Derek G. Currie** is now vice president of Standard in charge of Eastern division manufacturing and sales, Bangor, Me. . . . Continental Can Co. has named **William E. Lockwood** manager of its Oakland, Calif., can plant and **Dan A. Gabrielson** manager of its Terminal Island, Calif., facility. . . . **George R. Moore** is now manager of Continental's Hazel-Atlas Glass Div. plant, Clarksburg, W. Va. . . . **Robert A. Glaenzer** is now manager of Owens-Illinois glass container sales to the brewing industry. Donald M. Swentzel is now comptroller of Kimble Glass Co., subsidiary of Owens-Illinois. . . . Federal Paper Board Co., Inc., has named **Otto Ohliger** superintendent of its Lindley Box and Paper Div., Marion, Ind. . . . **George S. McKnight** is now director of research of Oxford Paper Co. (*End*)

NOW . . .

MULTIPLE PACKETER **MODEL II**

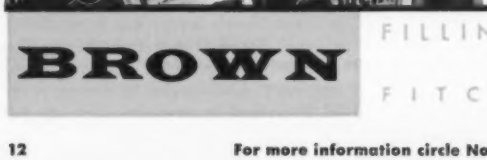
FOR BOTH LIQUIDS AND POWDERS

Completely Automatic production of up to 300 packets per minute. Interchangeable for ALL POWDER OPERATION — ALL LIQUID OPERATION — SIMULTANEOUS LIQUID AND POWDER OPERATION.

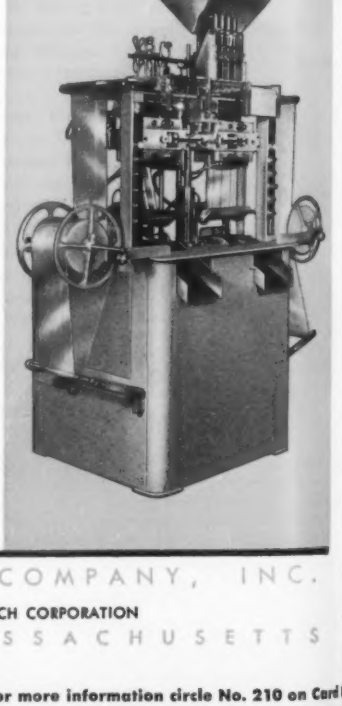
Produces up to 8 packets simultaneously. Packet sizes are variable from 1" x 1" to 8" x 8". The BFM Multiple Packeter forms, fills and heat seals — on all sides of the packet — from a continuous roll of heat-sealing material. A complete range of papers, foils, films and laminates can be handled, with electric eye registration of the printed material on both sides of the packet. Packets can be delivered in perforated strips *or* joined *or* individually.

POWDERS — Highly accurate volumetric or auger feeders for all free-flowing, granular and hygroscopic powders. Two different powders can be inserted into each packet. Hoppers can be divided for mixed filling.

LIQUIDS — The Multiple Packeter handles all free-flowing, viscous and semi-viscous liquids. Reverse vacuum design prevents stringers and leakers. Moyno or piston pumps available.



MODEL II showing simultaneous liquid and powder operation



For complete details on the new BFM Multiple Packeter Model II, write to:

BROWN FILLING MACHINE COMPANY, INC.

Division of FRANKLIN RESEARCH CORPORATION

FITCHBURG, MASSACHUSETTS

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U.S.I. POLYETHYLENE NEWS

A series for plastics and packaging executives by the makers of PETROTHENE® polyethylene resins

FEBRUARY, 1958 U.S. INDUSTRIAL CHEMICALS CO., DIVISION OF NATIONAL DISTILLERS AND CHEMICAL CORPORATION, 99 PARK AVE., N. Y. 16, N. Y.

Packaging Notes

New rim seal packaging machine that effects considerable savings in time and packaging film is being placed on the market. The hand-operated machine was designed for use in small food packaging operations, such as are common in super markets. The machine seals polyethylene film to the rim or lip of the food tray or container in a single operation. By eliminating the extra film that normally is folded and sealed under the tray, the machine reportedly saves almost 60% of the amount of film needed to make a sealed package. It is claimed that the machine can produce three to four times as many packages in a day as can be made by present hand wrapping methods.

The machine employs an electrically heated and thermostatically controlled upper section which is brought down on the film to make the rim seal. The heat sealing surfaces can be changed quickly for almost any size or shape of container. A set of sealing shoes for conventional package sizes and shapes is included with the machine.

Pressure-sensitive, paper-backed polyethylene tape solves problems of joining and patching poly film used in agriculture and as a water vapor and dust barrier in the construction field. The tape is easily applied by removing the paper backing and firmly pressing the tape smooth. The tape meets general building requirements, including FHA specifications.

Grain and silage can be packaged and preserved in poly bags, according to a study made at a leading Midwest agricultural school. Previous attempts to accomplish this with conventional bags failed because the bags permitted air to enter the package, spoiling the high moisture silage. Polyethylene reportedly lets gas escape, but prevents air from entering.

A new process permits polyethylene coated bags and cartons to be run on standard glue-sealing machinery at high speeds, using low-cost dextrin and starch adhesives. The process is expected to increase sharply the use of polyethylene-coated materials for packaging.

Possible applications include boxes for chlorinated powdered detergents, cereals, cake mixes and other products requiring sift-proof containers. Need for a loose inner liner would be eliminated. Polyethylene-coated cartonboard for frozen food packages would also cut costs by eliminating the need for overwraps.

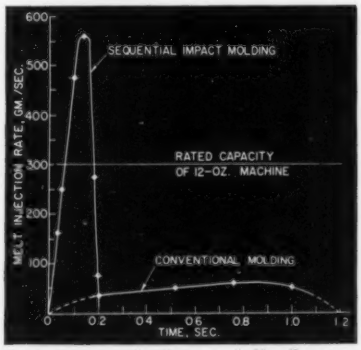
First commercial use for the process is in packaging personal hygiene products in a box made of polyethylene-coated paperboard. The coating replaces a glassine-paper laminate.

Sequential Impact Molding: New Technique Increases Output, Simplifies Fill Control

Method Based on Precisely Timed Release of Precompressed Melt

A radical improvement in the still new technique of impact molding was announced recently. Called Sequential Impact Molding (SIM), the new method reportedly yields from 30 to 50% more pounds of finished pieces per hour than the best yields for the same equipment employing conventional procedures. Mold filling rate is said to be increased six-fold.

In ordinary impact molding, the melt is precompressed, then "exploded" into all the mold cavities at one time. With SIM, the cavities are filled in carefully timed sequence, with each cavity receiving the full pressure of the injection setup. Sequencing is achieved by timed opening and closing of the valves in a multiple-nozzle manifold. The advantage of this method over sequenced valve gating is that all the special equipment is in the injection end of the machine rather than in the mold. One valving setup may be used for many different molds.



Filling rate graphs for two half-gallon containers molded under identical conditions by sequential impact molding and by conventional means.

Faster Filling Speed

In addition to increased output, one of the biggest advantages of SIM is reported to be the speed with which the cavities are filled. With SIM, cavity filling is so fast that mold temperature is no longer critical and amount of flow into the mold is more easily controlled. This speed also eliminates core shifting and weld lines by reducing the usual large, around-the-cavity pressure gradients that are responsible for core shifting in bottom gated cavities. SIM is also said to eliminate warping of thin sections caused by locked-in stresses.

Sequential opening of the valves also reduces clamp requirements, since only one cavity or group of cavities is filled at any one time. Thus, clamping force needed is much less than if all the cavities were filling together. This permits an increase in the number of cavities without undue concern for clamping capacity.

Equipment for SIM is being made and sold under license from the company which developed the technique. Both new molding machines and conversion kits for adapting existing equipment are being offered.

Booklet Describes Chemical Growth of National Distillers

A full color brochure describes the growing contribution to the chemical industry of National Distillers and Chemical Corporation. The 36-page booklet takes readers on a photo tour of plants operated by U.S.I. and its affiliated companies. Products of these operations — polyethylene, petrochemicals, agricultural and industrial chemicals, corrosion-resistant metals and high energy fuels — are described.

The brochure may be obtained by writing Editor, U.S.I. Polyethylene News, U.S. Industrial Chemicals Co., 99 Park Avenue, New York 16, N. Y.

To Wrap 1500-Mile Pipeline With Polyethylene Tape

Work has begun on a $3 million contract to wrap an entire 1500-mile pipeline with polyethylene tape. Although poly tape has been used extensively as a protective wrapping for pipelines, this reportedly is the first time that a major system has been completely wrapped with tape.

The pipeline runs from Baton Rouge, La., to Cutler, Fla. and is made of pipe varying from 18 to 24 inches in diameter. The contract represents the largest single order ever placed for a protective pipe coating of any kind.

Poly Wraps Win 32 Awards In Packaging Competition

Polyethylene bags and wraps took a total of 32 prizes recently in the third annual Flexible Packaging Competition, sponsored jointly by the National Flexible Packaging Association and Paper, Film & Foil magazine. Poly packages won more awards than were given to all other packaging materials combined. The top award of the competition went to a polyethylene package for girdles.

CHOOSE ANY!

The Battle Creek Model 475 handles practically any heat sealing film

PACKAGES LIKE THESE . . . now produced on former overwrapping machines can be efficiently handled by the Model 475— Typical applications: textile packages (underwear, handkerchiefs, pillow slips, etc.); paper products such as flat stationery, envelopes, napkins, bakery products, such as hot dog or hamburger buns, large cakes, specialty items; cartons; open top trays.

This truly all-purpose machine handles practically any heat sealing film over a wide range of products at production speeds up to 75 per minute. With the Model 475 you automatically anticipate future packaging opportunities offered by heat sealing films yet to be developed while enjoying the economies current films offer your packaging operation. The Model 475 wraps articles within the range of 5" to 12" lengths, 3" to 8½" widths and ¼" to 4" heights and sizes are converted easily within 15 minutes or less. A special 5" to 9" range is available for wider packages and for bundling purposes. Optional equipment is available if desired. An investment in the Model 475 is an investment in the future . . . its versatility will amaze you.

CHANGEOVER FROM ONE TYPE OF WRAPPING MATERIAL TO ANOTHER IS QUICK AND EASY

The Model 475 is "Continuous Flow" engineered to handle changes in wrapping materials with a minimum of effort, time and materials. Changeover from one type of soft film to another does not require the purchase of additional equipment . . . actually adjusting the electronic heating controls to the range appropriate for the heat sealing of the new material is all that is required. Battle Creek's exclusive new "Thermo-pad" sealing system has been tested on more than 40 different formulations of plastic overwraps, and handles all with equal ease. Also handles regular cellophanes, heat sealing foils, etc., equally as well as the newer plastic films.

OVERWRAP WITH ANY OF THESE SOFT PLASTIC FORMULATIONS . . . ON A MACHINE THAT WILL NOT BE OUTDATED BY NEW FILM DEVELOPMENTS

POLYETHYLENE . . .
medium, low and high density
in gauges 1 mil and up
POLYSTYRENES
HEAT SEALING CELLULOSE ACETATES
HEAT SEALING FOILS
POLYVINYL CHLORIDES
POLYPROPYLENES
CELLOPHANES
POLYMER COATED CELLOPHANE FILMS

BATTLE CREEK *Continuous Flow* PACKAGING
packaging machines, inc.

100 TWELFTH STREET
BATTLE CREEK, MICHIGAN

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Paper Coated with SYL-OFF

lifts easily and cleanly from all sticky products

Here's a new, effective way to speed processing and handling of sticky products. How? By using packages or interleaving sheets coated with one of the new SYL-OFF* silicone paper coatings. SYL-OFF coatings speed handling, reduce product waste, provide a new selling advantage.

A SYL-OFF coating gives excellent anti-adhesive properties to paper and paperboard containers — from glassine to boxboard. Permits removal of all the product quickly, without sticking and tearing. Even the gummiest products won't adhere to a SYL-OFF coating. Of over 100 materials tested — including asphalt, candy, glue, adhesive, unvulcanized rubber — none was found to stick except a silicone adhesive!

If you process, stock, or ship sticky materials, a SYL-OFF coating will benefit you and your customer in time and money saved.

Even the stickiest pressure-sensitive adhesive film without a backing doesn't stick to interleaving packaging sheets coated with a SYL-OFF coating.

A SYL-OFF Coating Offers These Advantages

- Won't migrate, transfer, or contaminate.
- Doesn't alter papers' features.
- Costs little more, if any, than ordinary anti-adhesives.
- Lasts as long as the stock itself.
- Reduces shipping costs—lighter in weight than conventional coatings.
- Improves water repellency.

Write Dept. 5214 for free samples, full information, list of suppliers on request.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

* T. M. Dow Corning Corporation

Now VITAFILM For Food Packaging

Announcing Newly Formulated Type F VITAFILM For Food Packaging– ***a truly tremendous performer.*** *Read this:*

Now from Goodyear research comes a standout film for the food-packaging field–*combining all of the characteristics most sought after for food merchandising and protection in a versatile film of crystal clarity.*

It is newly formulated Type F VITAFILM–a special foods-use development of one of the most successful packaging films ever created.

Here are just a few suggested applications:

AS A LAMINATION with paper, foil or other films – it could create wonderful new POUCH PACKAGING OF PHARMACEUTICALS, DRIED AND POWDERED FOODS and HYGROSCOPICS. It is outstanding as a vacuum-pack material for luncheon meats and cheese.

AS A STRAIGHT WRAP–it can excel for direct overwrapping or Carton and Tray Overwrapping of CANDY, POPCORN, CONFECTIONERY ITEMS, COOKIES, CRACKERS, CEREALS, DRIED FOODS and more!

Here is why New Type F VITAFILM *will do these things so well:*

It is DIMENSIONALLY STABLE, HIGHLY PUNCTURE-RESISTANT, PRINTS BEAUTIFULLY, WORKS EASILY on HIGH-SPEED MACHINERY, SEALS TO A WELDED SEAM over a wide range of temperatures, does not attract dust, WILL GREATLY EXTEND SHELF LIFE and PROTECT FRESHNESS, has a distinctive QUALITY "FEEL"!

For full facts on this new Goodyear development, call your nearest Goodyear Packaging Engineer–or write: Goodyear, Packaging Films Dept. B-6432, Akron 16, Ohio.

For more information circle No. 213 on Reader Service Card

Versatility

NEW Vitafilm Type F

by GOODYEAR

Finest Film for Fresher Foods

Vitafilm, a Polyvinyl chloride—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

THESE FIRMS

Do Better with Doughboy LABELERS

Mrs. Smith's Pretzel Co.
Easton, Pa.

J. P. Fritz Wholesale Co.
Newport, Minnesota

Bradley Candy Co.
Nashville, Tenn.

Dayton Nut Products Co.
Cincinnati, Ohio

Big-Tex Distributing Co.
Dallas, Texas

Fresno Macaroni Co.
Fresno, California

Burry Biscuit Co.
Elizabeth, New Jersey

General Candy Co.
Chicago 39, Illinois

Welch Nut & Candy Co.
Chicago, Illinois

Anderson Candies, Inc.
Wilmington, N. C.

King's Bakery, Inc.
Colledgedale, Tenn.

Seyfert Foods Co., Inc.
Fort Wayne, Indiana

C & C Distributors
Sharon, Pa.

Kimbell Candy Co.
Chicago, Illinois

Dorothy Flicek Industries
Chicago, Illinois

Boston Sausage & Provision Co.
Boston, Mass.

D. F. Stauffer Biscuit Co.
York, Pa.

Reed & Prince Mfg. Co.
Worcester, Mass.

Wells Mfg. Co.
New Vienna, Ohio

More Candy Co.
Rochester, N. Y.

Mrs. Slaby's Noodle Co.
Berwyn, Ill.

Ohio Art Co.
Bryan, Ohio

School House Candy Co.
Providence, Rhode Island

The Fleming Co., Inc.
Topeka, Kansas

Peanut Products Co.
Indianapolis, Ind. and Des Moines, Iowa

Walter Johnson Cookie Co.
Tulsa, Oklahoma

Flavour Candy Co.
Chicago, Illinois

Mason Candy Co.
Trinidad, Colorado

Barnard Nut Co.
Miami, Florida

H. H. Evon Co.
Chicago, Illinois

Mamma's Cookies Bakeries
Cicero, Illinois

Whites Food Products Co.
Oakland, California

Pack twice as fast with

Doughboy

JAW SEALER-LABELERS

MODEL PJS

The new Doughboy Jaw Sealer-Labeler will do the work of two and sometimes three ordinary labeling machines. As soon as the bag touches the vacuum (air) control, the machine takes over and leaves operator's hands free to reach for the next bag. It automatically labels, seals, and if desired, codes and punches the package. The automatic cycle cuts operator motions, increases production speed and assures better packaging. Pneumatic pick-up assures *positive* single label delivery from label box to sealing jaws. Label clamp holding bar assures *positive* positioning of label at sealing jaw. Adjustable folding bar assures *positive* label folding.

CODER AND HOLE PUNCH OPTIONAL

Coder and Hole punch are optional. An embossed code is precision made from metal type which is easily placed in accessible holder at the front of the sealing jaw. The punch, made of high carbon steel, punches a clean edged, round hole exactly centered in label.

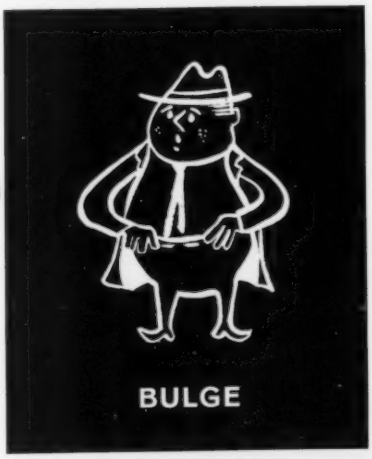
Doughboy

INDUSTRIES, INC.
MECHANICAL DIVISION
NEW RICHMOND, WISCONSIN, U.S.A.

For more information circle No. 214 on Reader Service Card

4 PACKAGING PROBLEMS

that punish the purse



and what to do about them

Pleas
turn
page

STONE-COR

another **spark*** from Stone...

SOLVES ALL THESE PROBLEMS

Stone-Cor is a humidity-resistant, heavy-duty corrugating medium. It is especially processed to provide about 33⅓ per cent greater stacking strength than regular corrugating medium.

Single wall standard vs. single wall Stone-Cor—A 200 lb. test A flute box, size 10″ x 10″ x 10″, will test 660 lbs. at ¾″ deflection. The same box with Stone-Cor corrugations will test stack 880 lbs., or ⅓ higher. These tests were run with the board conditioned at 50 per cent relative humidity at a temperature of 73 degrees. When the humidity is raised to 85 per cent and the temperature to 85 degrees, the box with regular corrugations tests 397 lbs., and the Stone-Cor box tests 704 lbs.

Single wall Stone-Cor vs. double wall standard—Another series of tests between 275 lb. test double wall boxes with C and B flutes and regular corrugating medium and 275 lb. test Stone-Cor single wall boxes showed the following results:

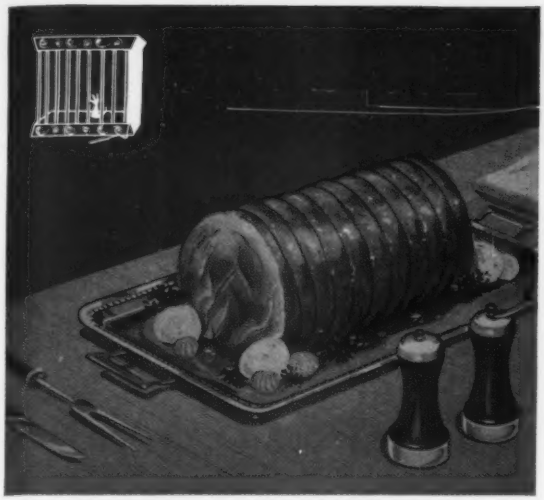
On top-to-bottom compression tests, the double wall boxes tested 2070 lbs. and the single wall Stone-Cor boxes 2161 lbs., a gain of 4.4%. These results were obtained at 72 degrees temperature and 50% relative humidity; at 80 degrees and 85 R.H. the Stone-Cor boxes indicated a 12% greater stacking strength.

Flat crush and end-to-end superiority—On flat crush, Stone-Cor will average 75 per cent to 80 per cent above flat crush standard for regular single wall board. In addition, end-to-end compression is approximately 32 per cent greater.

For more information and a sample of Stone-Cor, simply mail the coupon at right.

Where there's **spark***...

there's a saving



Overpackaging—A large meat packer is now packing 50 to 60 pounds of frozen meat in Stone-Cor boxes instead of solid fibre. Protection is equal—cost of containers is about 15% less, plus providing humidity protection.

Cobweb space—By using Stone-Cor an appliance manufacturer was able to store his product in stacks of 15 instead of 12. Thus "cobweb space" became usable storage space with no increase in floor area.

Package wilt—Stone-Cor boxes containing plastic bags and replacing metal cans enabled a chocolate syrup manufacturer to ship his products safely into high-humidity dairies—and save 60 per cent.

Package bulge—Metal bottle closures are packed hot. When they cool, they shrink. Result—cartons bulged when stacked. The problem was solved with Stone-Cor 275 lb. test double wall cartons. These Stone-Cor cartons at less cost and less tare weight outperformed 350 lb. test standard medium double wall cartons.

*Stone
packaging
and
research
know-how

STONE CONTAINER CORPORATION

General Office: 4200 West 42nd Place • Chicago 32, Illinois
Sales offices in most principal cities

Stone Container Corporation
4200 West 42nd Place—Chicago 32, Illinois Dept. A-59
Please send sample of Stone-Cor and more information about this product that solves problems that punish the purse.

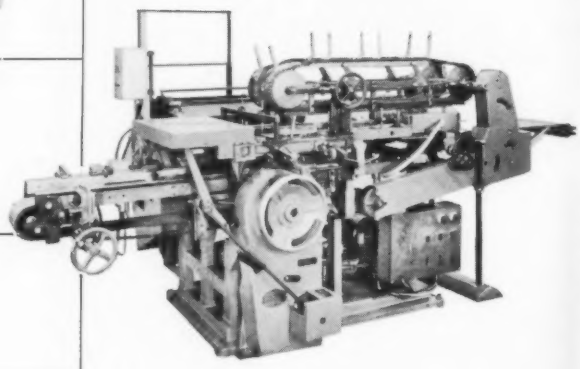
Name_____ Position_____

Company_____

Address_____

City, zone, state_____

NOW increased speed UP TO 120 PACKAGES A MINUTE on the PACKAGE Model FA



For consistently neat, attractive wrappings, the Package Model FA now gives you speeds up to 120 packages a minute in the smaller sizes. One machine assures top daily output on cartons, trays or specialty items. Size changes require only minutes time, and another roll of wrapping material can be inserted in less than five minutes. An electric eye mechanism gives you the most accurate registration possible, with automatic paper stop to control feeding.

WRAP WITH POLYETHYLENE TOO! Special features on the FA assure trouble-free operation when wrapping poly. All FA parts in contact with the poly covered packages are Teflon coated to prevent drag. Thin Fiberglas belts—an exclusive Package application—cover flexible side heaters and coolers for fast positive sealing of the double-point end folds.

For full details on wrapping with polyethylene and the Model FA contact your nearest PACKAGE representative.

compare these features

MATERIALS: FA glues or heat seals. It can handle waxed, sulphite or Kraft paper, cellophane, glassine, polyethylene and reinforced foils.

SIZE RANGE: For Model FA, 2″ to 11½″ L, 1⅛″ to 5⅝″ W, ⅜″ to 3½″ H. Models FA-2, -3 and -4 will handle larger packages.

PAPER FEEDS: Both roll and sheet feed is available.

END FOLDS: Double-point end fold is standard; reverse double-point fold, single- or double-point turned-under fold, crimp seal and special folding for extension edge boxes also available.

ATTACHMENTS: Easy-opening tape, medallion and code dater attachments available.

PMMI

PACKAGE

PACKAGE MACHINERY COMPANY, EAST LONGMEADOW, MASS.
NEW YORK • PHILADELPHIA • ATLANTA • BOSTON • CLEVELAND • CHICAGO • KANSAS CITY
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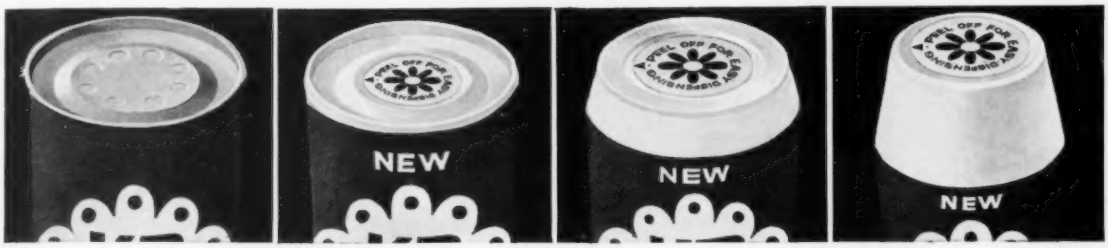
DOW | Plastiatrics

DOW'S CLINICAL APPROACH TO HEALTHY PLASTICS APPLICATION

in packaging

STYRON 475 HAS SOLVED LONG STANDING PROBLEMS IN CLEANSER INDUSTRY WITH THE SAME ECONOMICAL ADVANTAGES TRADITIONAL MATERIALS OFFER



IT ELIMINATES THE PROBLEM OF RUST, OXIDATION AND PRODUCT REACTION

With the spotlight on packaging in today's market, package engineers, retailers and consumers alike have become more and more aware of the shortcomings in many traditional packaging materials. Packages once taken for granted are now being critically appraised in terms of fabrication, function and economy.

Plastics in general, and Dow plastics in particular, have solved many old packaging problems. And now Styron® 475, prominent member of the Dow family of plastics, is eliminating the problem of rust, oxidation and product reaction in composite cleanser cans.

Now, with higher production rates in plastic fabrication, Styron 475 (high impact polystyrene) can solve some long-standing problems of the cleanser industry with the same economic advantages traditional materials offer.

Composite can assembly operations need no major modification to utilize Styron 475 for end caps. The only change would be from a crimper to an adhesive applicator for joining the caps to the tubes.

And with proper adhesive, the fiber can and plastic end cap become an integral unit. Tests show that a good adhesive seal is far more leak resistant than a crimped metal seal. Naturally, since all plastics transmit moisture, the product should be tested for the intended shelf life of product.

There is a significant advantage in being able to produce plastic end caps on high volume production equipment. With such equipment the raw material assumes a high percentage of the manufacturing costs. This being the case, the overall cost of the end caps should be relatively unaffected by any variation in the other economic factors involved in producing these items. In addition the caps can be produced in virtually any color at no additional expense.

Fiberboard cleanser cans fitted with end caps of Styron 475 offer new functional and sales advantages. Styron won't react with the product . . . won't leave rust or black oxidation stains when in contact with moist surfaces. Moreover, colorful end caps of Styron complement package sidewalls for eye appeal never before possible.

Styron plastic offers the package engineer an ideal medium for achieving the maximum in functional design at surprisingly low cost. Plastic end caps offer a new interpretation for design which would enhance the appearance of the cleanser can as it stands on the shelf at retail or with the homemaker. Dow packaging engineers are ready to help you put Styron to work in packages that prove their worth in today's market. Get in touch with the Dow man in your area, or write to The Dow Chemical Company, Plastics Packaging Service 2170DH2, Midland, Michigan.

AMERICA'S FIRST FAMILY OF POLYSTYRENES

GENERAL PURPOSE
STYRON ®666
STYRON 689 (Easy Flow)

MEDIUM IMPACT
STYRON 330 (Easy Flow—Translucent)
STYRON 777
STYRON 369 (High Heat)

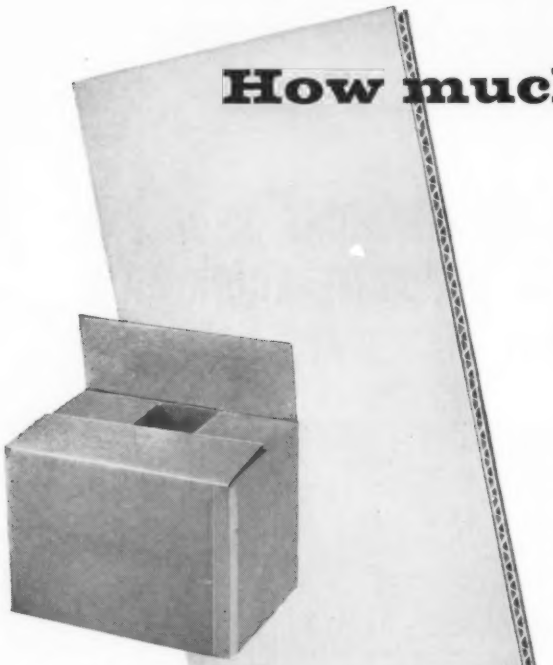
HIGH IMPACT
STYRON 475
STYRON 440 (Heat Resistant)
STYRON 440M (Easy Flow)
STYRON 480 (Extra-High Impact)

HEAT RESISTANT
STYRON 683
STYRON 700

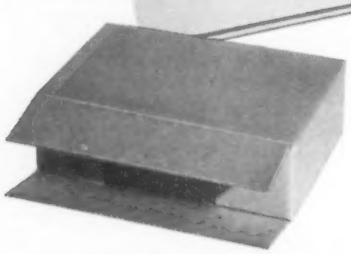
THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

For more information circle No. 217 on Reader Service Card

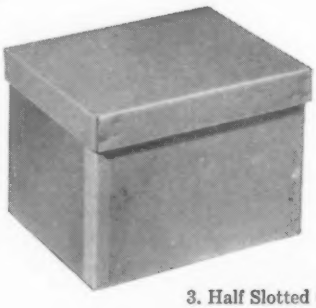
How much tailoring does



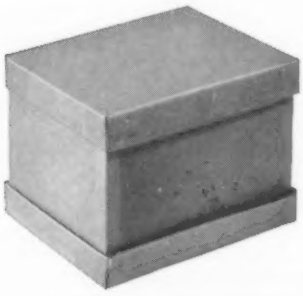
1. Regular Slotted Container



2. Special Flap Slotted Container



3. Half Slotted Container



4. Double Cover Box

Picking the proper corrugated shipping carton is like buying a suit. Rarely will a ready-made, "off-the-shelf" unit fit perfectly. Some modifications usually are needed; possibly even a complete custom-built job. It all depends on your product and how it is normally handled and shipped.

You may find, for example, among the representative basic box types shown here one that's just right for you. Or perhaps further structural design work would enable you to ship more efficiently and economically.

Talk it over with your local Union Box representative. He's an expert at pin-pointing all the pertinent factors. And at recommending or helping develop the most practical box for your needs.

1. Regular Slotted Container

Probably the most popular type used today. Fits all standard automatic packing and sealing units. All flaps the same length; outer flaps meet in center. Single- or double-wall construction is used, depending on degree of

about types of Union Boxes

your shipping container need?

protection your product needs.

Similar to the "Regular Slotted" is the "Center Special Slotted Container". Top and bottom areas are stronger; both inner and outer flaps meet at box center.

2. Special Flap Slotted Container

There are two kinds of "Special Flap" boxes. In one, the top and bottom flaps partially overlap. In the other (shown left) they overlap completely, providing double thickness at top and bottom. When strapped shut, flaps override each other, form snug, non-butting closure. If glued, adhesive covers full flap, assures extra safe, durable bond.

3. Half Slotted Container

Bottom is similar to Regular Slotted Container. Flanged cover is sent as a blank for set-up by shipper. Good as combination shipping shelf package. Without cover, used for batteries, other heavy, small items. Also, as a transfer file or stock box.

4. Double Cover Box

Ship heavy items where strapping is necessary? This three-piece box with telescoping covers might be just the ticket. Excellent stacking strength; strong covers take rough handling. Often used in large sizes for bulk packs on pallets.

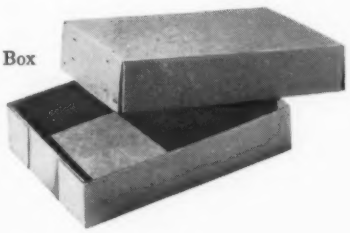
5. Telescope Box

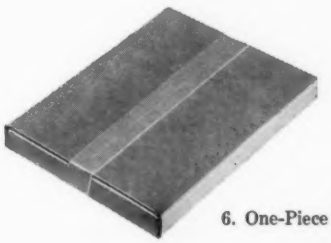
You'll probably need a box like this if you ship flat items such as paper, books, advertising material, etc. It protects with a double build-up of sheet around sidewalls and corners which also gives you maximum stacking strength. May be constructed as a full telescope (see below) or as a partial telescope.

6. One-Piece Folder

Another excellent shipper for books, catalogs, etc. Packs and closes quickly and easily. Mostly used for parcel post and express shipments. Also made up as "One-Piece Special Folder" where all flaps meet in center.

5. Telescope Box





6. One-Piece Folder

Write for new, informative booklet, "Types of Corrugated Boxes."

union camp

UNION BOXES

UNION BAG-CAMP PAPER Corporation

233 BROADWAY, NEW YORK 7, N. Y.

Factories: *Savannah, Ga., Trenton, N. J., Chicago, Ill., Lakeland, Fla.*

Sales Offices: *Eastern Division—1400 E. State Street, Trenton, N. J.*
Southern Division—P.O. Box 570, Savannah, Ga.; P.O. Box 454, Lakeland, Fla.
Western Division—4545 W. Palmer, Chicago, Ill.

LUDLOW

ANNOUNCES

PACKAGING

Here are some of the new Ludlow plastics now available to you for testing:

A **PROPLENE*** A clear, strong, high-gloss packaging film made from polypropylene resin. Performs well in a variety of packaging machines. Good printability. Exceptional shelf life and oil resistance.

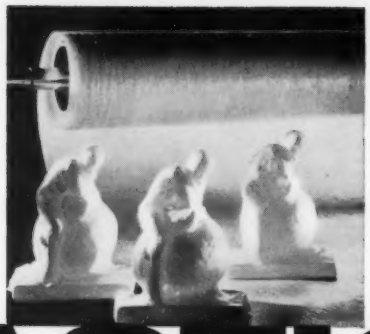
B **CAPLENE*** A strong, exceptionally clear packaging film made from nylon-6. Tensile strength ranges from 13,800 to 17,000 lbs. per square inch. Excellent resistance to greases, oils and odors.

C **METAFOAM*** A flexible, textured sheeting made from foamed polyolefin, of particular interest to the food packaging field. Tests show excellent thermoformability, insulation values, heat sealability and abrasion resistance.

METAPLENE* A medium density polyethylene film with high gloss, unusual clarity and other improved characteristics. It lowers cost of skin packaging. Can be boiled and heat sealed. Excellent machineability.

A

*Trademarks applied for by Ludlow Papers, Inc.



PLASTICS

NEW

FILMS!

Ludlow Plastics presents a broad new line of thermoplastic films and foams that offer important advantages to the packagi ıg industry. Tested by twenty-three different manufacturers, these films have been acclaimed for outstanding performance in a wide variety of packaging applications. The recently perfected Ludlow Process gives these films some important characteristics *not* to be found in conventional thermoplastic materials.

One of these films can help *you* lower production costs, speed up your packaging operation, or increase your sales by making a better package.

For complete information on the entire Ludlow Plastics line, including samples and technical data, write:

LUDLOW PLASTICS

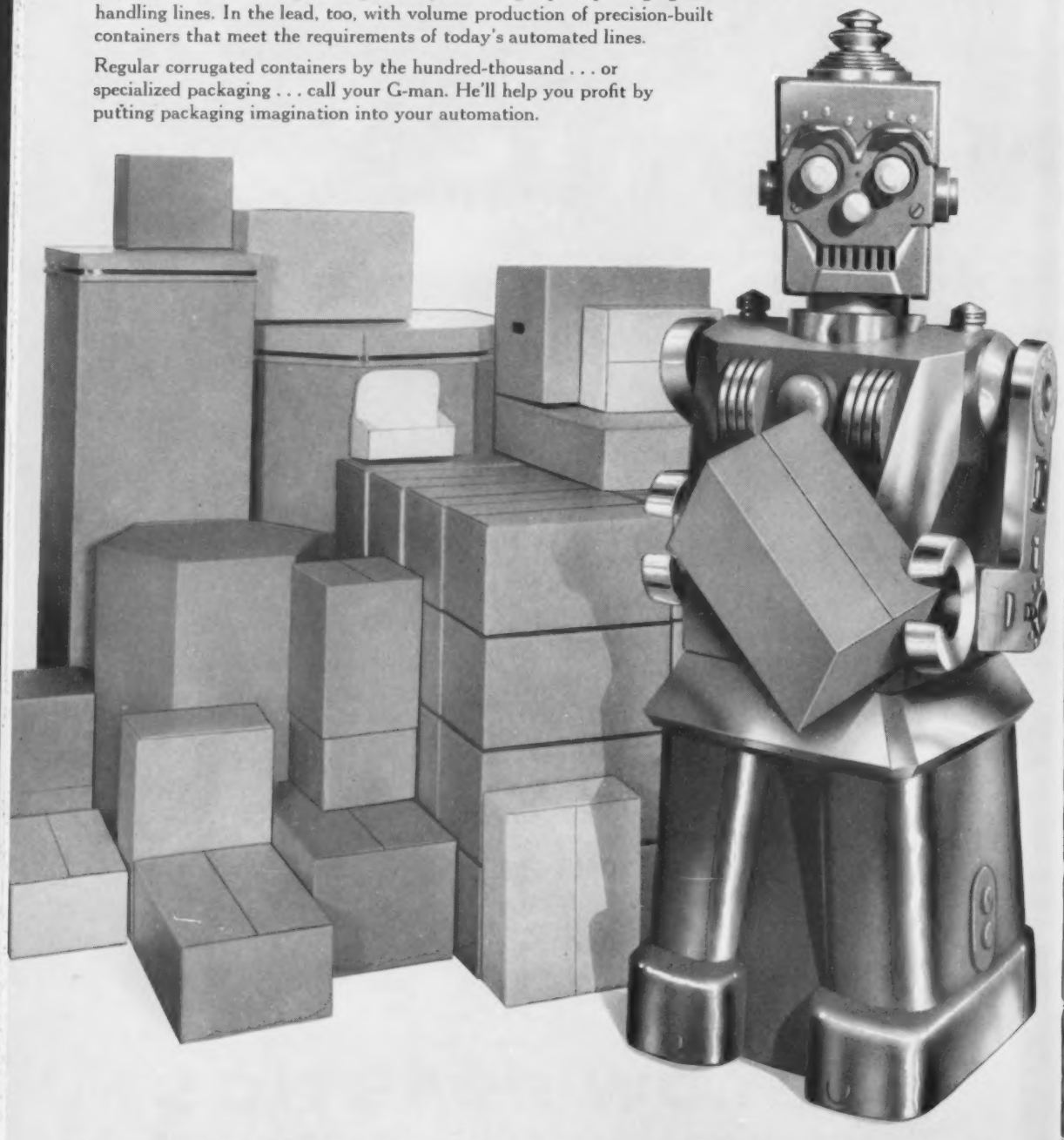
NEEDHAM HEIGHTS 94, MASSACHUSETTS

Ludlow Plastics is a division of LUDLOW PAPERS, INC., manufacturers of fine papers, gummed label papers, gummed tapes, building papers and packaging papers. Ludlow Papers, Inc., is a subsidiary of Ludlow Manufacturing & Sales Company, manufacturers of jute and jute products.

GAYLORD PUTS IMAGINATION INTO YOUR AUTOMATION

Not ready for robots? Fast-moving progress in automation can out-date your packaging operations in just a few years. That's why you'll find Gaylord in the lead with new engineering techniques for high-speed packaging and handling lines. In the lead, too, with volume production of precision-built containers that meet the requirements of today's automated lines.

Regular corrugated containers by the hundred-thousand . . . or specialized packaging . . . call your G-man. He'll help you profit by putting packaging imagination into your automation.



GAYLORD
CONTAINER CORPORATION

Gaylord Boxes

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

DIVISION OF **Crown Zellerbach Corporation**

Stapling slashes costs, solves tough shipping and packaging problems for food industry

All industries have fastening problems, but they're especially critical in the food field. That's why you'll find Bostitch stapling so widely used by growers, packers and retailers.

Stapling's speed helps move perishables to market fast—for top prices. It cuts costs to safeguard profits. Staples are strong and sure. They withstand moisture and changes in temperature. 800 Bostitch staplers and 200 sizes and types of staples meet a wide range of fastening requirements.

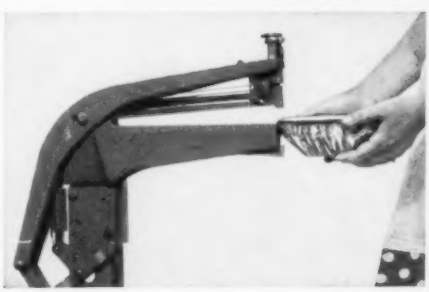
You may need a fastening method that offers these benefits. Chances are good that Bostitch stapling can help you. One of over 300 Bostitch Economy Men, who work out of 123 U.S. and Canadian cities, will gladly investigate. He's listed under "Bostitch" in your phone directory—or send us the coupon.

Stapling lettuce cartons in the field is 3 times faster than wire binding—quick adjust knob sets stapler for varying board thicknesses or bulging contents.

Leading meat packer finds stapling cartons 33⅓% faster than nailing wooden boxes. Increases production while cutting labor and material costs.

Stapling beats hand tying 2 to 1 sealing grapefruit bags at citrus grove. The special forked blade speeds fastening of mesh and cloth bag drawstrings.

50 pounds of refrigerated live lobsters go in this stapled corrugated container. Stapling provides a more secure seal when boxes get wet and is faster than tape formerly used.



Stapling covers to plates for frozen pies. Staples withstand extremes of cold and moisture—pies arrive in perfect condition.

Fasten it better and faster with

BOSTITCH®
STAPLERS AND STAPLES

Bostitch, 862 Briggs Drive, East Greenwich, Rhode Island

☐ Please send me information on stapling in the food field. I'm especially interested in stapling for _____

_____

☐ Please send free bulletins on ways stapling cuts costs for other businesses.

I want to fasten: ☐ corrugated board ☐ cartons ☐ fabric ☐ leather ☐ plastic bags ☐ wood ☐ roofing ☐ rubber ☐ light metals

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

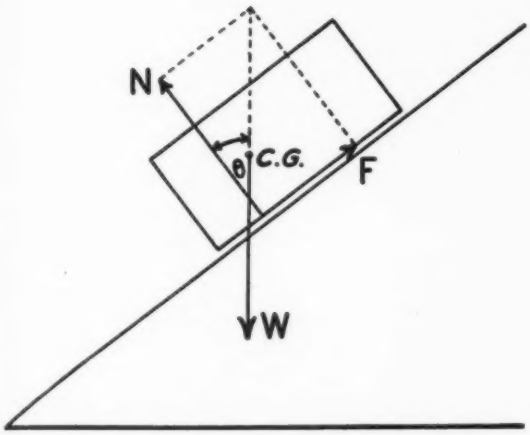
Printing sells
what the shipper ships

Clean, sharp printing makes traveling billboards of H & D corrugated boxes. Brand names get attention, merchandise moves faster. Is your shipping box making a colorful impression? Better see H & D.

HINDE & DAUCH
Division of West Virginia Pulp and Paper Company

AUTHORITY ON PACKAGING • SANDUSKY, OHIO
15 FACTORIES • 42 SALES OFFICES

You can build an accurate friction tester



- **Uses natural tangent principle**
- **Provides easy means of measuring friction**
- **Determines both static and kinetic friction**

Fig. 1. Schematic diagram of inclined-plane method of measuring coefficient of friction. Based on principle that coefficient of static friction is natural tangent of angle (angle of repose of the incline) at which slide or slippage occurs. (See Equations 1, 2, and 3.)

By A. R. McManus,
Chemical Laboratory Supervisor,
and R. J. Rother,
Coatings Development Chemist,
Research and Development Division,
Gaylord Container Corporation,
Div. Crown Zellerbach Corporation,
St. Louis

By developing an efficient and accurate version of an inclined-plane type of friction tester, we have eliminated the possibility of any errors in measuring the coefficient of friction (COF) of fibreboard boxes and folding cartons. Although we used a simple method of testing friction for more than 20 years, it was crude, and several important factors showed us the real need for the one we built and use today.

For years there has been the problem of boxes sliding in boxcars, fork-lift trucks, and so on, and there was interest in friction measurement as long as 20 years ago. However, this problem exists to a much greater degree today.

Since work is constantly underway to improve performance and appearance of boxes and folding cartons, it is essential that we have the best means for testing the results of new developments—boards with special sizing and finishing. Smoother surfaces which make the container and printing more attractive also make it more difficult to handle.

Need for efficient tester. Therefore, a more efficient friction tester was needed to determine accurately the relative degree of slipperiness of a carton or box (or of the board from which it is made) to determine whether or not a carton will give trouble on a machine or a box will give trouble in handling. Folding cartons whose surfaces do not have approximately the same degree of slippage might cause trouble on present-day high-speed cartoning equipment. Boxes are not effective containers if, in multiple unit loads, they slip too easily, or, if they are too cohesive and do not slide easily or rapidly enough.

We recognize that friction is a problem with many users as well as suppliers and we wish to pass on the information we have deter-

Constant improvement and changes in the surfaces of paper and fibreboard to make containers more attractive are also making them more difficult to handle. As a result, the problem of friction becomes greater every day. To provide a fast and accurate means of measuring friction, the authors developed an efficient and simple tester which they describe in such a manner that anyone can build one like it at reasonable cost.

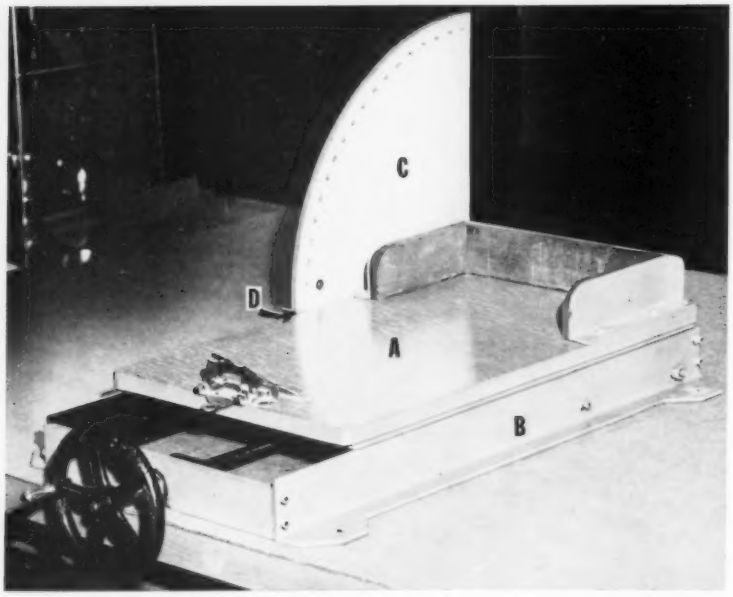


Fig. 2. Friction tester developed by the authors. It is accurate, efficient, and simple to construct at reasonable cost. Note that, when inclinable plane (A) is at rest on base frame (B) in true horizontal position, pointer (D) is at 0° on measuring scale (C). When plane is raised to true vertical position, pointer will rest on 90°.

mined as being relative to measuring COF. Should you desire to construct a friction tester, you may have ideas for changes and alterations to the one we built for our use. However, we are giving you the basic facts and precautionary measures you should take in building an accurate and efficient tester.

What COF Is Required?

What COF do you need for a box? How can you determine it? An ideal value cannot be assigned to all boxes of one type which are to be used by different companies, as the ideal for a specific box depends on how the user is going to use it. Some of the questions the user must ask himself are: Is it going to run on automatic equipment or be handled individually? Is it going to be stacked? What are its size, contents, gross weight? What means of transporting is to be used? All of these factors, and more, enter into the decision of: What COF?

An arbitrary value. Actually, one might say that the COF of a given carton or box is an arbitrary value which can be established by studying a user's problem. Once it has been determined that a specific item will be used in an identical way day in and day out—on an automatic cartoning machine, for instance—the user can insist that his supplier deliver future cartons having this established COF. At this point, it might be well to incorporate the value with a plus or minus tolerance as part of the specification for the item.

The equipment we built is not restricted to measuring solid and corrugated fibreboard. It can be used for determining the COF of paper and plastics. In fact, it is suitable for almost any material which is in flat form. Although our tester was designed and is used primarily for measuring static friction (resistance to being *put* in motion), it can be used reasonably well for determining kinetic friction—resistance between two surfaces while one of them is *in* motion.

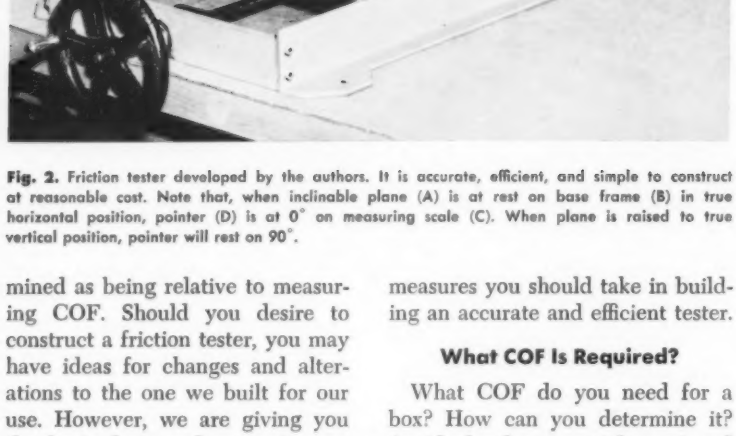


Fig. 3. Friction tester with inclinable plane (A) elevated to point at which weight (E) *just begins* to slide. Natural tangent of this reading (angle of repose) is coefficient of static friction of corrugated fibreboard sample shown. During a test, plane is elevated slowly at a uniform rate of speed. Most satisfactory rate of speed was found to be a *maximum* of 1½° of arc per sec.

Based On Natural Tangent Principle

The design of the tester is based on the principle that the coefficient of static friction (COF_s) is the natural tangent of the angle (angle of repose) at which the slide or slippage occurs. One of the laws of friction is: ***The friction between two surfaces is proportional to the force pressing them together.*** By this law, the friction and normal force between two surfaces vary

together. Thus, their ratio must be constant. This ratio is called the COF and is defined as

$$COF = \frac{\text{force required to overcome friction}}{\text{force pressing surfaces together}} . \quad (1)$$

In Fig. 1, F is the component of the weight (W) which starts the body sliding, or, the force required to overcome friction; and N is the component of the weight normal to the surface pressed upon, or, the force pressing the two surfaces together. Then, by the definition in Equation 1,

$$COF_s = \frac{F}{N} . \quad (2)$$

One of the three principal trigonometric functions of an acute angle in a right triangle is: tan ∠ = opposite side/adjacent side. Thus, in Fig. 1,

$$\tan \theta = \frac{F}{N} . \quad (3)$$

Then, looking at Equations 2 and 3,

$$COF_s = \frac{F}{N} = \tan \theta$$

where θ is identical to the angle of repose of the incline.

Why the tangent? A question one might ask is why not express the COF as the angle instead of the tangent of the angle? The reason for this is that the natural tangent is a numerical value which is more easily understood and causes differences in COF to be clearer. In other words, **there is a larger numerical spread between the tangent values.**

Use scrap material. A friction tester is not difficult to make. In fact, our new one (see Figs. 2, 3, and 4) was made from scrap material lying idle in the warehouse. The tester consists of the following major parts:

1. Inclinable plane.
2. A suitable base to affix the inclinable plane firmly.
3. A mechanism for raising the inclinable plane.
4. Method or apparatus for measuring the angle of the inclinable plane.

Fig. 4. Elevating mechanism of friction tester consists of four rocker arms (G) actuated by threaded drive (H) made of ¾-in. steel rod with standard coarse threads. It is highly important that mechanism be precision made to prevent any vibration or "wobble" during operation.

5. Weight for the upper sample.

Inclinable Plane

The inclinable plane is constructed of ¾-in. plywood 14 in. wide and 24 in. long. This particular size handles practically all folding cartons (completely set up) and flat pieces of board of sufficient size to test satisfactorily. Dimensions are a matter of choice and should be determined to suit the particular needs. However, keep in mind that it should be large enough and strong enough to allow testing of whole cartons in some instances—not just portions of containers.

Has no "play" or "wobble." We backed up the plywood with a piece of ⅛-in. thick steel plate to assure having a good, solid anchorage to the base frame at the point of hinging. The two hinges are of the ordinary removable-pin, butt type. They are mounted to the steel backing plate and to the framework of the base. It is important that they be precision mounted so as to have no "play" or "wobble."

An angle iron backstop is mounted at the "lower" end of the inclinable plane to prevent the weight from sliding off during a test. A spring clamp mounted at the "up-

Fig. 5. Weight used for testing friction is of convenient size to handle, and in proportion to size of tester and samples to be tested. Simple clamping device has true cylinder drilled off-center longitudinally, with two knurled portions which "grab" sample as cylinder is turned. Cylinder is shown in unlocked position. Longitudinal axis is enough off center that device will lock samples ranging in thickness from thinnest paper to thickest corrugated fibreboard.

per" end of the plane provides a means of holding the test sample snugly. A pointer mounted on the edge of the plane toward the measuring arc and flush with the plane's top surface completed its fabrication.

Base Frame

The base consists of a rectangular frame the same width as the inclinable plane, but a few inches longer to permit working space between the spring clamp and the drive-wheel when the plane is at rest horizontally. The sides of the frame are made of 3-in. angle iron; the ends of ½-in. steel plate. The inside depth of the base frame must be governed by the amount of space required for the elevating mechanism.

It is necessary that the base frame be square and true, and precision made so as to be absolutely solid. Also, it is well to provide four mounting holes so it can be anchored to a solid table in a true horizontal position.

Elevating Mechanism

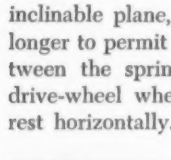
The mechanism we use for raising the inclinable plane is of the rocker-arm type actuated by a threaded drive. It can best be explained by viewing Fig. 4. The arms are the same length. The drive is made of a ¾-in. steel rod with standard coarse threads. Here again, let us stress the importance of having mechanism precision so as to prevent any vibration or "wobble" during operation. It should have sufficient range in movement to raise the inclinable plane through an arc of 90°.

Laying Out Arc

Of great importance is the means of measuring the angle to which the inclinable plane is raised during a test. Great care must be taken in laying out the arc (or quarter of a circle) and sectioning it off in precise degees. The radius of the arc must be of a size to be accurate. We have found that ours, which is 12 in., is completely satisfactory. It is constructed of ¼-in. plywood onto which we glued a piece of bleached paperboard. After inscribing the calibrations, a coat of clear lacquer was applied to protect it.

Aligning the arc and plane. To align the arc, the inclinable plane must be resting firmly on the base frame. In this position, it should be perfectly horizontal in both directions (lengthwise and crosswise). If not, the base frame must be adjusted until the plane is level. At this time, the arc should be mounted to its brackets and positioned so that the pointer, which is flush with the top surface of the inclinable plane, coincides with 0° on the arc. Then the plane should be raised until it is perfectly vertical, at which position the pointer must be lined up with 90°.

It may require several adjustments before final alignment is accurate, but remember these two facts: (1) The top surface of the inclinable plane must be *horizontal* at 0°, and (2) *vertical* at 90°. **Don't overlook using a protractor** while you are aligning the arc with the plane. Also, a good level is required for checking the true horizontal of



A. R. McManus joined Gaylord Container Corporation in 1937 as a laboratory technician and has had many years' experience in research on paper adhesives. He is a member of the raw materials committee and chairman of the corrugating adhesives subcommittee of the Technical Association of the Pulp and Paper Industry.

R. J. Rother attended St. Louis and Washington universities, and joined Gaylord Container Corporation in 1949. Previously he was with the Orchard Paper Company, where he gained his background in coatings development work. He currently specializes in research work on paper coatings. He is a member of the St. Louis district, Chicago section of TAPPI.

the inclinable plane when it is at rest at 0°.

The Weight

On a theoretical basis, the amount of weight used to press the test surfaces together makes no difference in COF when testing by the inclined-plane method. However, we feel it does have a very slight effect in practical applications. For this reason, it is well to use the same amount of weight for all testing. With the horizontal method of testing, it would have a direct bearing on the end results of a test.

Is convenient size. The weight for holding the upper sample should be of a convenient size to handle and in proportion to the size of the tester and samples to be tested. We have found that a weight 6 in. long and 4 in. wide is sufficient and the most practical for most applications; also, it is suited to our particular sized tester. As for the thickness of the weight, this will depend on how heavy it is to be and the type of mechanism for locking the test sample in place.

Our standard weight (Fig. 5) is 12 lb., and, since the surface area in contact with the test sample is 24 sq. in. (6 x 4 in.), a force of ½ lb/sq. in. is exerted on the test surfaces. It should be pointed out here that in preparing a sample to be tested, the material should be cut to the exact size of the weight's largest surface, allowing for enough extra length to insert one end of the sample into the locking mechanism. (See Fig. 3.)

Simple clamping device. The method of affixing the sample to the weight was determined by the needs. The clamping device of our weight is a true cylinder drilled off-center longitudinally. (See Fig. 5.) Two raised portions which are knurled serve to "grab" the sample as the cylinder is turned. In the illustration, the cylinder is shown in the unlocked position.

This easily operated device clamps the sample rapidly and tightly with no chance of the sample's slipping out. Also, the longitudinal axis is enough off center so that the device will lock samples ranging in thickness from the thinnest paper to the thickest corrugated fibreboard.

With the problems of friction growing every day, you will want to have a good tester like the one described by Mr. McManus and Mr. Rother. To aid you in building the equipment, a single extra copy of this article is available as long as our supply lasts. Contact our reader service department on your company letterhead for your free copy.

Operating The Tester

The tester is simple and easy to operate. The two samples are cut —the upper one to the proper size to be affixed to the weight and the lower one about 1 in. wider and approximately twice the length of the upper. The upper sample is locked in place on the weight and the lower one clamped firmly to the inclinable plane. With the plane resting horizontally and its pointer on 0°, position the weight toward the "upper" end of the plane and on the lower sample with the two sample surfaces in contact with one another.

Use uniform rate of speed. By means of the drive wheel, the inclinable plane is raised slowly and at a fairly uniform rate of speed so that there will be little or no vibration or variation. We have found the most satisfactory rate of speed to be a *maximum* of 1½° of arc per sec. It may be necessary to run it slower for some items. Raising of the plane is continued until the weight *just begins* to slide, at which time a reading is taken. A little practice will be required at first.

The tangent of the angle is found through the use of any table giving the values of the trigonometric functions. This tangent is the COF_s of the material surfaces tested. It is well to test duplicate samples, or possibly more, especially until operation of the tester is mastered.

Determines kinetic friction, too. To test for kinetic friction, using this inclined-plane type tester, the samples are prepared in the same manner as described above. The inclinable plane is raised to a point where slippage is *constant and uniform*, the angle is read, and the tangent of the angle is determined. Remember another law of friction which is: *Static friction is greater than kinetic friction.* Thus, in testing for kinetic friction, the angle of the inclinable plane will always be *less* than when testing for static friction. For kinetic friction, this angle is called the limiting sliding angle.

Why Not Mechanize?

One might ask why not mechanize the tester by means of a motor and gear reducer. This could be done, but about the only advantage would be the assurance of uniform speed. Several disadvantages would be the slowness in returning the plane to horizontal rest, which also would require a reversing mechanism. It would be inconvenient and time consuming. Also, with a motor, kinetic friction could not be measured.

We cannot figure the cost of this tester since it was built of scrap materials. Also, the machinist worked on it in his spare time. However, we do know that the cost was minor compared to its use value in our laboratories. (*End*)

Polyurethane foam protects delicate precision instruments

Replaces handmade wood blocks in storage cases
Allows size standardization of these cases
Reduces over-all packaging costs

By John T. Armbruster,
Industrial Designer,
Instrument Division,
American Optical Company,
Buffalo

Precision optical products demand "tailored" interior protection. By going to polyurethane foam as cushioning in storage cases and shipping containers for delicate optical instruments, Mr. Armbruster explains, his company has eliminated damage, reduced gross shipping weights, and standardized on container sizes—all resulting in substantial annual savings and improved product quality.

The versatility of the modern microscope with its mechanical and optical components presents a difficult packaging problem. A wide range of precision optical accessories demands "tailored" interior protection against breakage and hazards to alignment and adjustment during shipment.

Such accessories as objectives, mechanical stages, eyepieces, ocular bodies and others, which are not included as component parts of the microscope, must be packaged in a safe manner. Further, with the majority of these accessories, each must have its own storage case for protecting the delicate part when not in use. The protection afforded the item by this case is an important factor when determining the necessary packaging requirements for shipping the complete unit.

Old Case Costly

In the past, most of the storage cases have consisted of a box with a number of small, oddly shaped blocks mounted at strategic points inside the box, depending upon the particular shape of the accessory. The entire box was lined with velveteen. Through the use of polyurethane foam, we have eliminated this costly method of packaging, eliminated all damage of one form or another to the accessory, standardized to certain sized boxes, reduced our packaging costs to a marked degree, and raised the efficiency of our packaging operation.

Blocks handmade. Each of the formerly used boxes (see Fig. 1, box "b") consisted of a wood frame with a solid fibreboard top and bottom. The outside was covered with a pyroxylin-coated fabric. The blocks, mounted inside the body and the cover, were made of a hardwood cut to specified shapes to fit a given instrument. Very close tolerances had to be maintained on the dimensions of these all-handmade and smoothly sanded blocks. Since the entire inside of the finished box was covered with velveteen, it was necessary to allow for its thickness during the manufacture of the blocks.

Spacing and proper positioning of the blocks inside the box was a time-consuming job, as this was just as important as the shape and size of the blocks themselves. For some particular instruments, it was necessary to cushion certain blocks with a high-density sponge rubber.

Good Fit Essential

Close tolerances on the blocks and their exact locations within the box were essential in order that the instrument would be completely immobile. A good fit had to be obtained. If too tight, the accessory would not fit in the box; if too loose, the instrument would shake—a source of potential damage. With too snug a fit, the box cover could be forced from its hinges upon being closed. With some components, it was necessary to use a piece of commercial cushioning material around the product to insure adequate protection dur-

John T. Armbruster is a graduate of Pratt Institute in industrial design. He has been in charge of packaging and styling for almost 18 years with the Instrument Division of American Optical. During more than 20 years' experience in his field, he has had many patents issued.

ing shipping and normal handling.

Case limited to one product. Being completely handmade, a great deal of time was required to make one box for one specific accessory. A change in the design of the instrument, however slight, meant a change in size and/or location of the blocks; sometimes it meant a change in the whole box. Thus, a particular box was limited to use for one given product.

For shipment of a single unit, a great deal of packing such as shredded paper, tissue, and excelsior had to be used around the case inside its corrugated shipping container, and likewise for multiple-unit shipments. The human element was always involved, with the possibility of using too much or too little interior packaging material.

Use Polyurethane Foam

Basic construction of our present cases is the same as that of the former ones; that is, each has a wood frame with a solid fibreboard top and bottom. They are covered, however, with a vinyl-coated fabric. Polyurethane foam (density: 2 lb/cu. ft.) is used inside as cushioning. It is either die-cut or saw-cut, depending upon the design of the accessory.

Has simple shapes. For instance, Fig. 2 shows one of our mechanical stages packaged in a foam-lined box. Note the simple, rectangular shapes involved as compared to the intricate ones of the blocks used previously. (See also Fig. 1.) Also, note that any one of four different sizes and shapes of stages can be packaged in the single-sized box containing the same shape of foam.

Standardize Sizes

We have gained many advantages with the polyurethane foam-lined box, as compared to the one containing wood blocks. Sizes have been standardized so that one size will accept one of several like instruments. (See Fig. 2.) On the average, for every three slightly different-sized boxes previously required, we now have only one. In many instances, one size will handle more than three different accessories.

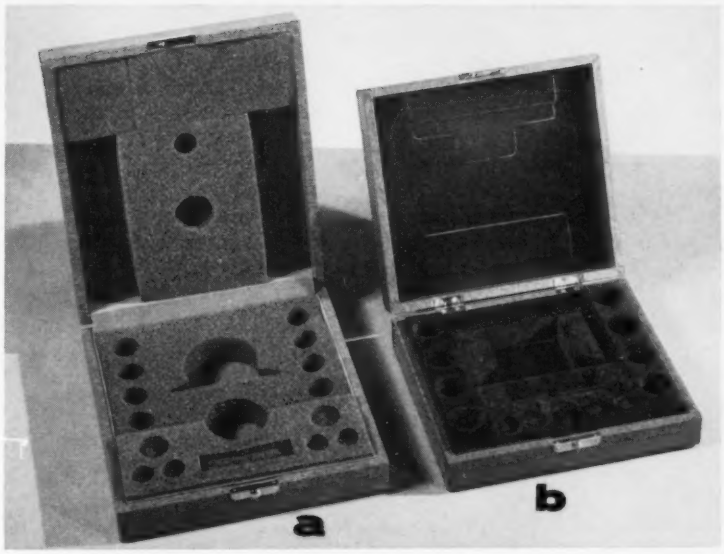


Fig. 1. Typical instrument cases. New (a) one has die-cut foam for cushioning; old (b), hardwood blocks handmade, smoothly sanded, velveteen covered. Close tolerances and exact positions of blocks were essential to good fit. Slight change in instrument design meant change in block size and/or location; sometimes, change in whole box. New box results in a saving of about 30%.

Lower costs. Standardization to a fewer number of sizes has simplified our inventory control. Obviously, we are able to purchase in larger quantities, which results in a lower cost per box. This, added to the less expensive, foam-lined box, has yielded us substantial savings in packaging materials —approximately 30 per cent.

In packing for shipment, the foam-lined box has eliminated the use of outer cushioning. We simply wrap the individual box in a single layer of tissue to prevent any abrasion of the outer surface. The

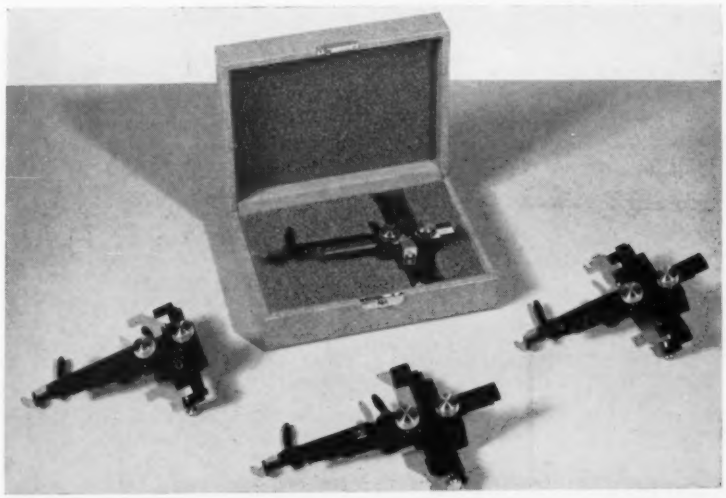


Fig. 2. Four different models of attachable microscope stages use one standardized accessory case having foam as cushion. With old case containing blocks, each stage had its own particular box. Note simple, rectangular shapes of foam involved as compared to intricate ones of blocks used previously. (See Fig. 1.)

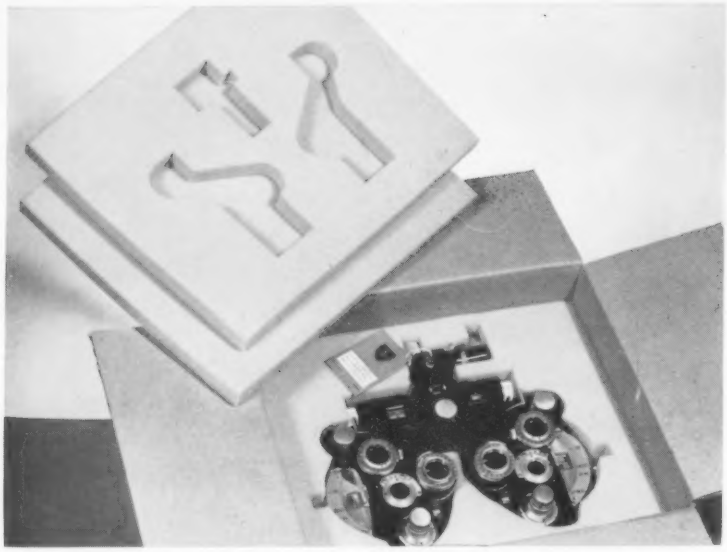


Fig. 3. Four pieces of polyurethane foam—2 die cut, 2 plain—(bottom one not visible) is only cushioning material used for shipping delicate, highly sensitive phoropter. Die-cut shapes and thicknesses of layers determined by protuberances and shape of instrument. Polyethylene bag (not shown) fits over product to keep it dirt-free.

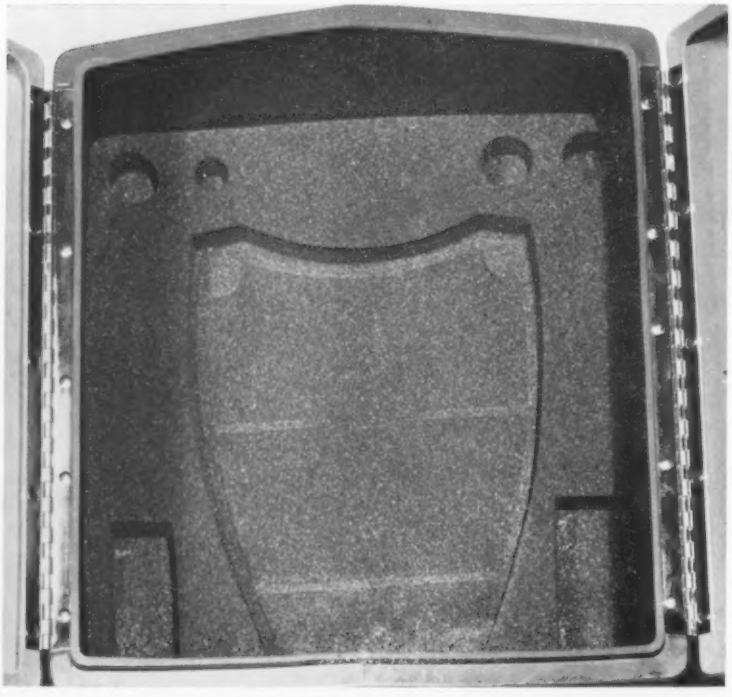
corrugated shipping containers are dimensioned so as to obtain a snug pack, whether for a single case or multiple-unit shipment. Use of foam in the boxes and elimination of most dunnage for cushioning have decreased the gross weights considerably as compared to the old package. Thus, shipping costs have been reduced substantially.

Shows less wear. Although we insisted upon perfect fit of an accessory in the old type of case, the probability of damage or misadjustment while inserting or removing the instrument was higher than with the new case. The foam-lined box allows one to do this with great ease. Better appearance is obtained with the foam, as wear and tear during normal use does not show as was the case with the velveteen.

Protects Sensitive Instrument During Shipment

One accurate and highly sensitive optical instrument is the phoroptor which is used in examination of the eyes. We now pack it in a corrugated shipping container using only polyurethane foam for cushioning, consisting of four layers. (See Fig. 3) The bottom layer is a solid piece, 1 in. thick. The next two layers are die-cut to fit the specific shape of the instrument, and are 1¾ and 1 in. thick respectively. The top layer is solid and ⅞ in. thick. Thicknesses of the top and bottom solid layers were determined by the protuberances on the instrument.

(*Continued on Page 78*)



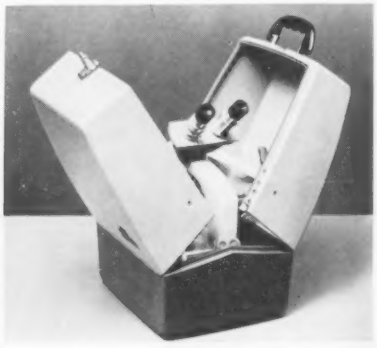


Fig. 4. *(left)* Inside of base portion of plastic microscope carrying case. Cushioning consists of two layers of foam, glued together. Solid bottom layer (seen through large die-cut opening) is ¼ in. thick and provides ample shock protection to instrument which rests directly on it. "Heel stock" is ideal for this use due to its density being slightly higher than that of normal foam. Top die-cut layer, ¾ in. thick, prevents instrument's shifting from side to side during carrying; also, provides holes for extra accessories. Regular foam, not heel stock, is used for the top layer. *(upper right)* Full view of carrying case. Special supports inside hinged covers hold instrument down on the foam insert.

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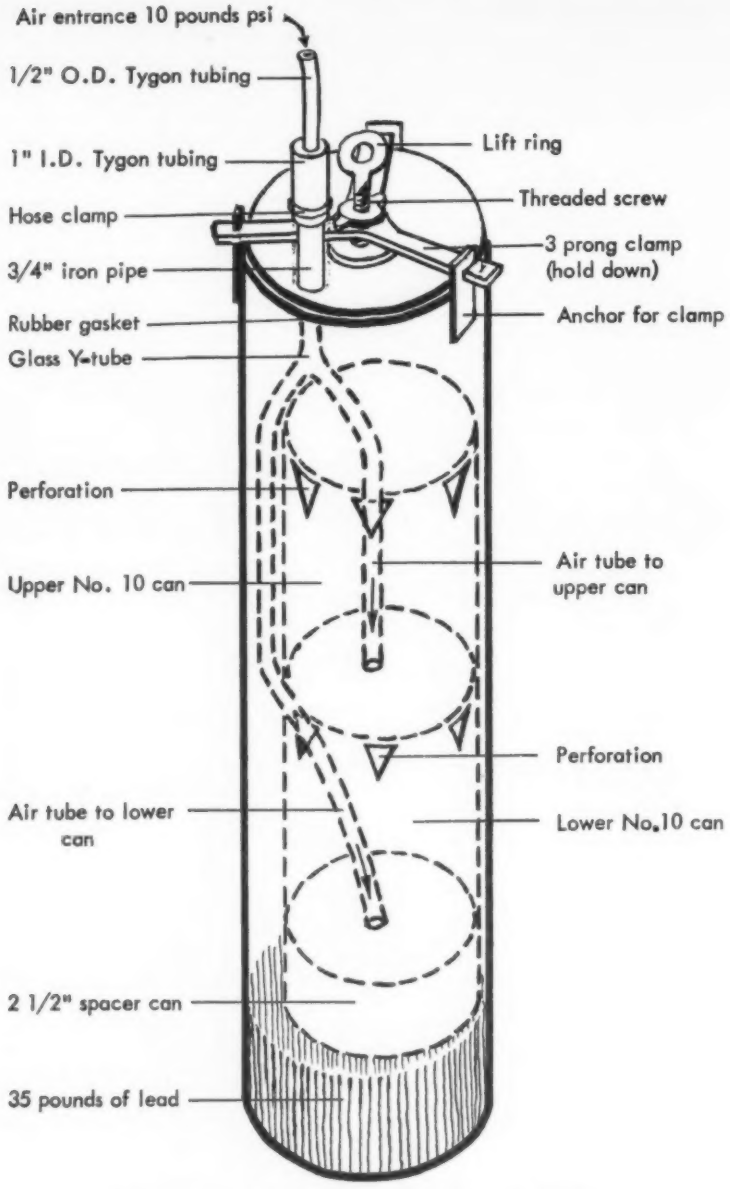

Aeration chamber used during the process of radiation under water.

Packaginffe gamma-irradiatfre

Although the use of gamma rays for food preservation is still in the experimental stages, proper functional packaging is necessary for the success of such preservation and retaining of quality. In this study, certain fresh fruits and vegetables are packaged in various packaging materials prior to being subjected to different doses of gamma-irradiation, after which quality of the commodities is evaluated. Scored by the hedonic scale, results of the tests are reported in detail and presented in tabular form. The authors explain the experimental procedure used and the method of evaluating quality. They report the results of the effects of the can liners and the can conditions on the commodities.

Food preservation by gamma rays is a new method which is yet in the experimental stage. This new method of food preservation opens many new avenues and problems in the packaging methodology. For the success of food preservation and the retaining of the quality, the packaging of the product is an important factor. The packaging technics must keep up with the preservation methods.

This paper presents the investigations of different types of packaging for fresh fruits and vegetables prior to, and during, gamma-irradiation, and their effects on the subsequent quality and shelf life of the products.

EXPERIMENTAL PROCEDURE

Fruits and vegetables of prime quality, and as far as possible of uniform maturity, were selected for the experiments. Some of the products were obtained through a local wholesale dealer and others were grown on the experimental farms of the Utah State University.

*This paper reports research undertaken in cooperation with the Quartermaster Food & Container Institute for the Armed Forces, and has been assigned No. 798 in the series of papers approved for publication. The views or conclusions contained in this paper are those of authors. They are not to be construed as necessarily reflecting the views or endorsement of the Department of Defense.

†Contribution No. 68 (c) from Utah State Agricultural Experiment Station, Logan, Utah.

...ffects on the flavor and shelf life of ...fresh fruits and vegetables*†

Uses packaging materials of different types as can liners
Packs products inside liners
Subjects samples to gamma rays ranging in doses from 0 to 5 × 10^5 rads
Studies effects of aeration during irradiation
Evaluates products for quality – immediately after irradiation and subsequent storage at different temperatures and lengths of time

By D. K. Salunkhe,
L. H. Pollard,
R. K. Gerber,
Ethelwyn B. Wilcox,
College of Agriculture, Utah State University, Logan, Utah,

and Morris Simon,
Food Radiation Preservation Division, Quartermaster Food and Container Institute, Chicago

Some cans perforated. Some of the samples were cushioned within a can-lining material, such as a polyethylene bag; other samples were included without such lining and cushioning material prior to sealing under vacuum; others were sealed without vacuum in No. 10 tin cans. Some of the cans for certain treatments were perforated after sealing. If the fruits and vegetables were of such nature that they might be easily bruised or crushed, paperboard dividers were used to divide the can into three or four compartments along its length.

Each can was labeled indicating the dose and rate of gamma rays to be given. The cans, thus prepared for irradiation, were transported under refrigeration, 40° F. (4.4° C.) either to the Material Testing Reactor Station near Arco, Idaho, or to the Dugway Proving Ground, Dugway, Utah.

Use Special Aeration Chamber

During the process of irradiation at the Arco facility, air was forced into the perforated cans. However, air was not circulated in the perforated cans when irradiated at the Dugway facility. A special chamber, as illustrated, was constructed for this purpose from

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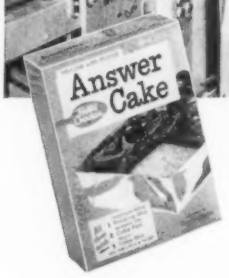

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a 2-ft. section of 7-in. diameter aluminum portable irrigation pipe with a thickness of 0.083 in.

An aluminum bottom was welded on one end, then the cylindrical tank was weighted with 35 lb. of lead. A maneuverable aluminum lid was designed to fit the other end and was made water tight with a rubber gasket. A 6-in. piece of 3/4-in. iron pipe was fastened with a gasket into the lid to which was clamped a 25-ft. length of 1-in. inner diameter Tygon tubing. A 25-ft. length of 1/2-in. outer diameter Tygon tubing was threaded through the larger piece of Tygon tubing.

Two perforated No. 10 cans of fruits or vegetables were placed in the chamber and air under 10 lb/sq. in. pressure was forced down the small tube. Within the chamber, the air was divided with a glass Y-tube and taken by auxiliary tubes to each perforated can of the product.

The exhaust air escaped from the chamber through the space between the small tube and the wall of the large tube. During radiation, the chamber was lowered in water to the bottom of the 18-ft. UIA‡ column in the radiation facility at M.T.R. Station near Arco, Idaho. The Tygon tubing connected the chamber to the surface of the water in the UIA column and also allowed several feet for handling in the room.

Evaluate Quality

Subsequent to irradiation, the cans were returned to the research laboratories of the Department of Horticulture and the Department of Foods and Nutrition. Here the irradiated products, along with non-irradiated control products, were evaluated for quality appraisal as well as for certain microbiological changes immediately after irradiation, and after storing the irradiated products for different lengths of time and at various temperatures.

Scored by hedonic scale. Quality of the irradiated fruits and vegetables was evaluated by a trained panel consisting of ten judges. Each irradiated product, along with the appropriate non-irradiated samples, was scored according to the hedonic scale (2) ranging from 1 to 9 (1—extreme dislike; 5—neither like nor dislike; and 9—extreme like). Some of the products were judged raw, and others were cooked prior to evaluation. Where possible, the data were analyzed statistically (*1*).

‡Named after University of Idaho, Aberdeen.

RESULTS

Effects Of Can Liners

Tomatoes. Pink tomatoes were placed in the following inner containers—can liners—and were irradiated to a dose of 4.65×10^5

ABOUT THE AUTHORS:

D. K. Salunkhe, assistant professor of horticulture, received his B. S. degree from Poona University in India, and his M. S. and Ph. D. degrees from Michigan State University. He has authored more than 25 scientific publications on food preservation and food chemistry. He is a member of American Association for the Advancement of Science and Institute of Food Technologists.

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TABLE I

Effect of Can Liner on the Flavor of Irradiated (4.65 × 10^5 Rads) Tomatoes

Can liner	Flavor score	Judges who disliked (%)
No radiation (control)	5.8	16
No "can liner" (control)	4.3	50
Saran, Dow Code No. 120	3.7	66
Aluminum foil, heavy duty, 0.001 in. thick	3.7	83
Glassine, 0.0015 in. thick	3.0	83
32-lb. parchment (unglazed)	3.0	83
27-lb. parchment (glazed)	2.8	100
Poly x 200	2.5	100
Polyethylene, 0.0015 in. thick	2.5	100
30-lb. unbleached kraft paper bag	2.5	100
Poly x 300	2.0	100
L.S.R. @ 0.05: Individual	2.0-1.7	

rads§ at the rate of 0.93 × 10^6 rads/hr.

1. Aluminum foil, heavy duty, 0.001 in. thick
2. 30-lb. unbleached kraft paper bag
3. Saran, Dow code No. 120
4. Polyethylene, 0.0015 in. thick
5. Glassine, 0.0015 in. thick
6. Poly x 200
7. Poly x 300

§A rad is a measure of radiation absorbed and is equal to 100 ergs/gm. of material being irradiated.

8. 32-lb. parchment (unglazed)
9. 27-lb. parchment (glazed)
10. No inner container (control)

All cans were perforated. A non-irradiated tomato sample was included in the experiment for comparison. The non-irradiated tomatoes were scored the highest. The remaining treatments were scored in descending order of acceptability as follows: No inner container, saran, aluminum foil, glassine, parchment (glazed and unglazed), kraft paper bag, poly x 200, polyethylene, and poly x 300. (See Table I)

Yellow sweet corn. Ears of sweet corn with and without husks (variety—Golden Cross Bantam) were placed in the following inner containers (can liners) prior to sealing and irradiation. These were irradiated at the doses of 0, 1, 3, and 5 × 10^5 rads at the rate of 1 × 10^6 rads/hr.

1. Polyethylene, 0.0015 in. thick
2. DuPont's experimental film No. 322
3. Mylar polyester film, type C, 0.0005 in. thick
4. Cellophane, 450 MSAD-84
5. Mylar, 0.001 in. thick, coated with 0.002 in. polyethylene
6. Cellophane, 450 K-202
7. Cellophane, 450 MSD (Oneida Ful-lok)
8. Saran, Dow code No. 120
9. 27-lb. parchment (glazed)
10. 32-lb. parchment, white (unglazed)
11. 32-lb. parchment, gray (unglazed)
12. 30-lb. unbleached kraft paper bag
13. Polyethylene, perforated
14. No inner container (control)

All cans were perforated and the sweet corn was evaluated for qual-

TABLE II

Effect of Radiation Dose and Can Liners on the Flavor of Yellow Sweet Corn Irradiated With and Without Husks when Evaluated 24-48 Hours After Irradiation

	Flavor score				can	Judges who disliked (%)				Flavor score				can	Judges who disliked (%)			
	Dose × 10^5 rads				liner	Dose × 10^5 rads				Dose × 10^5 rads				liner	Dose × 10^5 rads			
Can liner	0	1	3	5	mean	0	1	3	5	0	1	3	5	mean	0	1	3	5
Polyethylene, 0.0015 in. thick	7.4	6.1	6.9	7.0	6.9	0	20	10	10	7.4	7.5	6.6	7.4	7.2	10	0	10	0
DuPont No. 322	6.3	8.1	7.3	6.2	7.0	30	0	0	30	7.2	7.9	7.0	6.3	7.1	0	0	0	30
Mylar, polyester film, type C, 0.0005 in. thick	7.6	7.3	6.8	6.2	7.0	0	0	10	30	7.1	6.6	7.2	5.7	6.7	10	10	0	40
Cellophane, 450 MSAD-84	7.0	7.0	7.3	6.6	7.0	10	0	0	20	6.9	8.3	6.5	7.1	7.2	20	0	10	0
Mylar, 0.001 in. thick, coated with 0.002 in. polyethylene	7.3	8.0	7.9	6.2	7.4	10	0	0	30	7.0	6.7	5.6	6.2	6.4	10	10	40	30
Cellophane, 450 K-202	7.6	6.8	6.6	7.7	7.2	0	20	10	0	7.1	7.4	7.7	7.2	7.4	10	0	0	0
Cellophane, 450 MSD, (Ful-lok)	7.8	7.0	7.7	6.7	7.3	0	0	0	10	7.8	7.9	7.2	6.0	7.2	0	0	0	30
Saran, Dow code No. 120	8.1	6.5	7.8	7.1	7.4	0	10	0	10	7.5	7.1	6.1	7.5	7.1	10	0	30	0
27-lb. parchment (glazed)	8.0	8.1	7.7	5.8	7.4	0	0	10	40	6.8	7.3	6.7	6.4	6.8	20	0	20	20
32-lb. parchment, white (unglazed)	6.2	7.6	6.5	7.0	6.8	20	0	10	10	7.9	7.2	7.1	6.2	7.1	0	0	0	30
32-lb. parchment, gray (unglazed)	7.5	7.0	6.2	6.3	6.8	0	0	10	0	7.7	7.5	7.1	6.0	7.1	10	0	0	30
30-lb. unbleached kraft paper bag	6.8	7.0	6.4	6.2	6.6	0	10	20	20	7.2	7.2	6.8	5.7	6.7	10	0	10	30
Polyethylene, perforated	7.6	6.6	6.7	5.5	6.6	10	10	10	30	6.4	6.8	6.2	6.5	6.5	30	10	10	30
No "can liner" — sealed cans (control)	6.0	7.4	6.7	7.0	6.8	40	10	10	0	6.4	7.4	5.1	6.3	6.3	20	10	50	10
No "can liner" — perforated cans (control)	6.8	6.4	7.7	5.3	6.6	10	20	0	50	6.6	7.7	5.8	5.0	6.3	20	0	20	50
Dose mean	7.2	7.1	7.1	6.5						7.1	7.4	6.6	6.4					

L.R.S. @ 0.05:
Individual ..... 0.7-0.6 ..... 0.6-0.5
Dose mean ..... 0.2-0.1 ..... 0.1
Can liner mean ..... 0.3 ..... 0.3-0.2

TABLE III

Effect of Radiation Dose and Can Liners on the Flavor of Yellow Sweet Corn Irradiated With and Without Husks when Evaluated 10 Days (Storage at 40°F.) After Irradiation

Can liner	Flavor score: Dose × 10^5 rads 0	1	3	5	can liner mean	Judges who disliked (%): Dose × 10^5 rads 0	1	3	5	Flavor score: Dose × 10^5 rads 0	1	3	5	can liner mean	Judges who disliked (%): Dose × 10^5 rads 0	1	3	5
Polyethylene, 0.0015 in. thick	6.4	6.7	6.7	3.9	5.9	20	10	10	90	7.6	6.5	5.4	4.1	5.9	0	0	50	70
DuPont No. 322	7.5	7.1	6.4	4.7	6.4	10	0	10	60	7.6	5.9	6.5	2.9	5.7	10	30	10	90
Mylar, polyester film, type C, 0.0005 in. thick	5.8	5.6	5.9	4.0	5.3	40	30	20	70	7.1	5.2	5.8	5.5	5.9	10	30	20	30
Cellophane, 450 MSAD-84	6.2	6.4	5.9	3.6	5.5	10	20	30	60	6.8	5.9	6.1	3.8	5.7	0	30	10	70
Mylar, 0.001 in. thick, coated with 0.002 in. polyethylene	6.1	6.3	6.1	3.9	5.6	10	10	20	80	6.7	5.3	5.9	6.3	6.1	10	30	30	10
Cellophane, 450 K-202	6.4	6.8	6.8	5.5	6.4	10	0	0	30	6.8	6.6	5.5	4.5	5.9	0	0	30	60
Cellophane, 450 MSD, (Ful-lok)	6.7	6.2	5.3	4.0	5.6	10	20	40	70	6.5	6.5	7.2	5.4	6.4	0	10	0	40
Saran, Dow code No. 120	6.8	6.9	6.8	4.1	6.2	0	20	0	80	7.1	6.6	6.3	4.3	6.1	0	10	0	50
27-lb. parchment (glazed)	6.0	6.2	4.5	3.0	4.9	20	20	50	90	6.6	5.2	6.5	4.8	5.8	10	40	0	60
32-lb. parchment, white (unglazed)	6.0	5.2	6.4	4.4	5.5	30	30	10	50	6.4	6.1	5.4	4.6	5.6	10	0	20	60
32-lb. parchment, gray (unglazed)	6.9	5.6	6.9	4.0	5.9	0	40	0	70	5.6	5.7	4.7	3.7	4.9	30	30	40	90
30-lb. unbleached kraft paper bag	6.6	6.0	6.5	4.5	5.9	10	20	10	60	7.0	5.3	5.5	4.0	5.5	0	40	50	70
Polyethylene, perforated	5.6	6.1	5.6	3.8	5.3	30	30	40	60	6.4	6.4	5.7	4.6	5.8	20	20	20	60
No "can liner" — sealed cans (control)	7.3	6.3	5.4	2.6	5.4	0	0	30	90	5.7	5.9	3.9	4.0	4.9	30	30	70	80
No "can liner" — perforated cans (control)	6.1	6.2	5.0	4.4	5.4	20	10	40	70	5.8	5.8	4.7	5.8	5.5	10	20	60	30
Dose mean	6.4	6.2	6.0	4.0						6.6	5.9	5.6	4.5					

L.R.S. @ 0.05:
Individual ..... 0.6-0.5 ..... 0.7-0.6
Dose mean ..... 0.1 ..... 0.2
Can liner mean ..... 0.1 ..... 0.4-0.3

ity within 24 hr. after irradiation. Can liners had no significant effect on the quality of sweet corn. However, only a slight difference in the quality of sweet corn irradiated to 5 × 10^5 rads was evidenced. This difference was more pronounced after 10 days' storage at 40° F. (4.4° C.)—i.e., the sweet corn irradiated to 3 and 5 × 10^5 rads had marked off flavor.

Some beneficial effect of can liners such as saran, parchment, cellophane, DuPont's experimental film No. 322, and Mylar on the flavor of sweet corn was found. In addition, they can be used as cushioning material. In general, the quality of yellow sweet corn was maintained when irradiated with husks on. (See Tables II and III) Similar packaging effects were noticed when tomatoes and strawberries were irradiated using various can liners.

Effects Of Can Conditions

Yellow sweet corn. For this study, yellow sweet corn (variety—Golden Cross Bantam) with and without husks was irradiated in sealed and perforated cans at 0.93, 1.86, 3.72, and 4.65 × 10^5 rads at the rate of 0.93 × 10^6 rads/hr. The samples were evaluated for quality imme-

TABLE IV

Effect of Radiation Dose, Condition of Can, and Storage Period on the Flavor of Irradiated Sweet Corn With or Without Husks

Dose × 10^5 rads	Sample	Condition of can	Evaluated 24-48 hr. after irradiation: Flavor score	Judges who disliked (%)	Evaluated 10 days after irradiation: Flavor score	Judges who disliked (%)
0	With husks	Perforated	7.9	0	5.3	30
		Sealed	6.4	20	5.4	40
	Without husks	Perforated	7.8	10	6.4	20
		Sealed	5.6	40	5.7	30
		Mean	6.9		5.7	
1	With husks	Perforated	6.6	20	6.7	10
		Sealed	6.8	0	5.6	30
	Without husks	Perforated	7.9	0	6.6	10
		Sealed	6.6	10	5.3	30
		Mean	6.9		6.0	
3	With husks	Perforated	6.0	20	5.5	20
		Sealed	6.9	20	5.6	40
	Without husks	Perforated	7.0	0	5.0	50
		Sealed	3.6	80	5.3	40
		Mean	5.8		5.3	
5	With husks	Perforated	6.4	10	5.0	30
		Sealed	4.7	50	4.9	40
	Without husks	Perforated	5.4	30	4.3	70
		Sealed	3.8	80	5.2	40
		Mean	5.1		4.8	
Can condition mean		Perforated	6.8		5.6	
		Sealed	5.5		5.3	
Husk mean		With husks	6.4		5.5	
		Without husks	5.9		5.4	

L.S.R. @ 0.05 Individual ..... 1.5-1.3 ..... 1.7-1.4
Dose mean ..... 1.0-0.9 ..... 1.1-1.0
Can condition mean ..... 1.0-0.9 ..... 1.1-1.0
Husk mean ..... 0.7 ..... 0.7

TABLE V

Effect of Radiation Dose, Condition of Can, and Storage Period on the Flavor of Peaches

Doses × 10^5 rads	Condition of can	Evaluated 24-48 hr. after irradiation		Evaluated 10 days after irradiation	
		Flavor score	Judges who disliked (%)	Flavor score	Judges who disliked (%)
0	Perforated	6.3	10	7.8	0
	Sealed	4.4	50	*	*
	Mean	5.4		—	
1	Perforated	6.9	10	7.4	0
	Sealed	4.0	60	*	*
	Mean	5.5		—	
3	Perforated	6.5	10	6.8	10
	Sealed	1.9	100	*	*
	Mean	4.2		—	
5	Perforated	4.4	70	4.0	70
	Sealed	1.5	100	*	*
	Mean	3.0		—	
Can condition mean	Perforated	6.0		—	
	Sealed	3.0		—	

L.S.R. @ 0.05:

Individual	1.4-1.3	1.3-1.2
Dose mean	1.0-0.9	—
Can condition mean	0.6	—

*Samples were disintegrated and rotten.

TABLE VI

Effect of Radiation Dose, Condition of Can, and Storage Period on the Flavor of Lindalicious Strawberries

Dose × 10^5 rads	Condition of can	Evaluated 24-48 hr. after irradiation		Evaluated 10 days after irradiation	
		Flavor score	Judges who disliked (%)	Flavor score	Judges who disliked (%)
0	Perforated and aerated	7.6	0	7.5	0
	Sealed	7.2	0	7.5	0
	Vacuumed	7.3	10	2.7	90
	Mean	7.4		5.9	
0.93	Perforated and aerated	7.5	0	7.2	10
	Sealed	6.5	20	3.3	70
	Vacuumed	5.9	20	3.0	80
	Mean	6.6		4.5	
2.79	Perforated and aerated	5.5	40	4.8	40
	Sealed	3.8	60	3.5	80
	Vacuumed	3.2	70	2.7	90
	Mean	4.1		3.7	
4.65	Perforated and aerated	3.6	70	3.0	20
	Sealed	3.6	70	2.8	80
	Vacuumed	3.1	70	2.8	100
	Mean	3.4		2.9	
Can condition mean	Perforated and aerated	6.1		5.6	
	Sealed	5.3		4.3	
	Vacuumed	4.9		2.8	

L.S.R. @ 0.05:

Individual	1.5-1.2	1.3-1.1
Dose mean	0.7	0.7-0.6
Can condition mean	0.6	0.6-0.5

diately after irradiation. Sweet corn with the husks, in perforated cans, was scored slightly higher than that without husks in sealed cans.

No significant difference in the quality of sweet corn, with and without husk, was evidenced at that time. However, after 10 days' storage at 40° F. (4.4° C), the difference was pronounced, i.e., the sweet corn with husks was scored higher than the sweet corn without husks, regardless of the container condition. The increase in radiation dose progressively lowered the quality of sweet corn both in sealed and perforated cans. (See Table IV)

After 10 days at 40° F. (4.4° C.), a large amount of gas developed in non-irradiated cans. A small amount of gas was also observed in the sealed cans irradiated at 0.93×10^5 rads, but no gas was evident in the cans irradiated at 3.72 and 4.65×10^5 rads. However, after 45 days' storage, a moderate amount of bulging was seen in the cans which were irradiated at 3.72 and 4.65×10^5 rads.

Peaches. When Elberta peaches were irradiated at 0, 1, 3, and 5×10^5 rads, at the rate of 1×10^6 rads/hr. in sealed cans, an unacceptable product was developed. Hence, it was not evaluated. The samples which were aerated during the process of irradiation were somewhat acceptable. The results indicated that there was no significant difference in the quality of peaches which were non-irradiated samples after the end of 10 days' storage at 70° F. (21.1° C.). (See Table V)

Strawberries. Strawberries (variety—Lindalicious) were placed in No. 10 cans. Some of the cans were sealed, some were evacuated, and others were perforated. They were irradiated at 0, 0.93, 2.79, and 4.65×10^5 rads at the rate of 0.93×10^6 rads/hr.

In general, it may be said that as the radiation dose advanced, the quality of strawberries declined. Strawberries, when sealed under vacuum, deteriorated in quality

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TABLE VII

Effect of Radiation Dose, Condition of Can, and Storage Period on the Flavor of String Beans

Dose $\times 10^5$ rads	Condition of can	Evaluated 24-48 hr. after irradiation: Flavor score	Evaluated 24-48 hr. after irradiation: Judges who disliked (%)	Evaluated 10 days after irradiation: Flavor score	Evaluated 10 days after irradiation: Judges who disliked (%)
0	Perforated	6.7	10	6.7	10
	Sealed	5.5	40	*	*
	Vacuumed	4.6	60	*	*
	Mean	5.6		—	
0.93	Perforated	5.9	30	6.7	10
	Sealed	6.5	20	*	*
	Vacuumed	5.2	60	*	*
	Mean	5.9		—	
2.79	Perforated	6.1	10	6.7	10
	Sealed	5.7	30	*	*
	Vacuumed	3.8	60	*	*
	Mean	5.2		—	
4.65	Perforated	5.6	30	7.2	0
	Sealed	5.1	40	*	*
	Vacuumed	4.2	70	*	*
	Mean	5.0		—	
Can condition mean	Perforated	6.1		6.8	
	Sealed	5.7		—	
	Vacuumed	4.5		—	

L.S.R. @ 0.05:

Individual	1.6-1.3	1.4-1.3
Dose mean	0.8-0.7	—
Can condition mean	0.7-0.6	—

*Samples were disintegrated in the storage.

more than those either sealed or perforated and stored for 10 days under refrigeration, 40° F. (4.4° C.). (See Table VI) The true red color of strawberries was faded when sealed under vacuum and irradiated. It was found that the quality of strawberries was better in most cases when irradiated in perforated cans rather than in sealed cans. As the radiation dose advanced, a progressive decline in quality was evidenced.

String beans. String beans (variety—Blue Lake) were sealed in No. 10 cans. Some of the cans were sealed under vacuum and some were perforated. In perforated cans, no air was circulated during the process of irradiation. The cans were irradiated at 0.93, 2.79, and 4.65 $\times$ 10^5 rads at the approximate rate of 0.93 $\times$ 10^6 rads/hr.

The taste panel evaluated the irradiated and non-irradiated string beans after cooking. It was noticed that the quality of the irradiated products seemed to be improved when st· ·ed for 10 days at 40° F.

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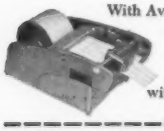

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(4.4° C.). The string beans when irradiated in evacuated cans, were of inferior quality. (See Table VII) They developed a rubber-like texture and were much more shriveled than the green beans in sealed cans or in perforated cans.

Asparagus. Approximately 2½ lb. of 6-in. asparagus spears were sealed in No. 10 cans without can liners. Some of the cans were perforated. The cans, thus prepared, were irradiated at 0, 0.93, 2.79, and 4.65 $\times$ 10^5 rads at the rate of 0.93 $\times$ 10^6 rads/hr. The asparagus was judged more acceptable after being irradiated with aeration through perforations of the can than irradiated in sealed cans.

However, in the perforated and aerated cans, the products were always superior to those in sealed cans. It is interesting to note that the quality of asparagus irradiated to 0.93 $\times$ 10^5 rads was improved when stored at 40° F. (4.4° C.) in a moist condition for 10 days after irradiation. (See Table VIII) Hence, it seems that the radiation

TABLE VIII

Effect of Radiation Dose, Condition of Can, and Storage Period on the Flavor of Asparagus

Dose $\times 10^5$ rads	Condition of can	Evaluated 24-48 hr. after irradiation		Evaluated 10 days after irradiation	
		Flavor score	Judges who disliked (%)	Flavor score	Judges who disliked (%)
0	Perforated and aerated	5.8	30	6.7	0
	Sealed	5.8	20	2.6	90
	Mean	5.8		4.7	
0.93	Perforated and aerated	5.8	30	6.3	10
	Sealed	5.8	40	3.2	90
	Mean	5.8		4.8	
2.79	Perforated and aerated	6.0	30	5.7	30
	Sealed	4.6	50	2.9	100
	Mean	5.3		4.3	
4.65	Perforated and aerated	6.7	0	6.6	10
	Sealed	4.8	40	3.0	80
	Mean	5.8		4.6	
Can condition mean	Perforated and aerated	6.1		6.3	
	Sealed	5.3		2.9	

L.S.R. @ 0.05:

Individual	1.5-1.3	1.4-1.2
Dose mean	1.0-0.9	0.9-0.8
Can condition mean	0.6	0.6

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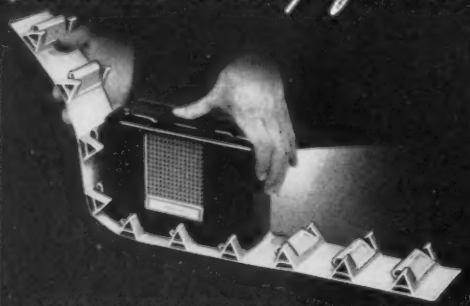

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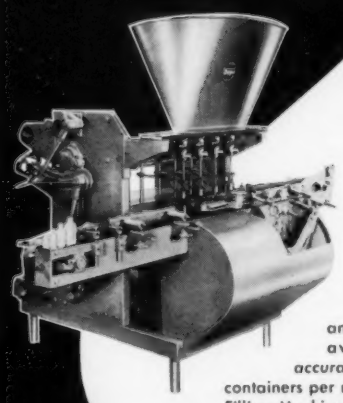

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TABLE IX

Effect of Radiation Dose, Condition of Can, and Storage Period on the Flavor of Tomatoes

Dose $\times 10^5$ rads	Condition of can	Evaluated 24-48 hr. after irradiation		Evaluated 10 days after irradiation	
		Flavor score	Judges who disliked (%)	Flavor score	Judges who disliked (%)
0	Perforated and aerated	6.9	20	5.9	20
	Sealed	8.1	0	3.3	70
	Mean	7.5		4.6	
0.93	Perforated and aerated	6.1	0	6.0	10
	Sealed	6.7	0	1.9	100
	Mean	6.4		4.0	
2.79	Perforated and aerated	4.7	50	3.0	90
	Sealed	4.5	70	1.4	100
	Mean	4.6		2.2	
4.65	Perforated and aerated	4.3	60	3.5	90
	Sealed	5.5	30	0.9	80
	Mean	4.9		2.3	
Can condition mean	Perforated and aerated	5.5		4.6	
	Sealed	6.2		1.9	

L.S.R. @ 0.05:

Individual	1.2-1.1	1.2-1.1
Dose mean	0.8-0.7	1.0-0.9
Can condition mean	0.5	0.7-0.6

flavor (at low doses) disappears after certain storage periods.

Tomatoes. Ripe tomatoes were sealed in No. 10 cans. Some of the cans were perforated. The cans thus prepared were irradiated to 0.93, 2.79, and 4.65 $\times$ 10^5 rads at the rate of 0.93 $\times$ 10^6 rads/hr. During the process of radiation the perforated cans were aerated. In general, the observations follow a similar pattern to that of asparagus. However, the quality of tomatoes was much poorer after 10 days' storage in sealed cans than in the perforated cans, regardless of radiation doses. (See Table IX)

Effects Of Can Liners And Can Conditions

Strawberries. Strawberries were placed in cans lined with polyethylene, Mylar, and also in cans with no liners. All samples were sealed in No. 10 cans. Some of the cans with polyethylene were canned under a vacuum. Some of the cans thus prepared were perforated. They were evaluated for quality

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immediately after irradiation at 0, 0.93, 2.79, and 4.65×10^5 rads at the rate of 0.93×10^6 rads/hr.

The results show that when can liners within cans were used during irradiation of strawberries, evaluation was detrimental; Mylar was slightly better than polyethylene. Strawberries irradiated at 2.79 and 4.65×10^5 rads with aeration were judged more acceptable than those irradiated in sealed cans. At the 4.65×10^5 rads level they were all unacceptable. (See Table X)

Tomatoes. A similar study was made with tomatoes using several can liners within sealed cans. These tomatoes were evaluated for quality immediately after irradiation. Tomatoes packaged in DuPont's experimental material No. 322 and irradiated at the 2.79×10^5 rads were judged better than those in other materials.

After a storage period of 10 days, a decrease in tomato acceptability with increased radiation dose was similar to that shown when judged immediately after irradiation. The

TABLE X

Effect of Radiation Dose, Can Liner, and Can Condition on the Flavor of Lindalicious Strawberries

Dose $\times 10^5$ rads	Can liner	Perforated cans: Flavor score	Perforated cans: Judges who disliked (%)	Sealed cans: Flavor score	Sealed cans: Judges who disliked (%)
0	None	7.1	20	7.0	10
	Polyethylene, 0.0015 in. thick	—	—	5.6	20
	Mylar, type C, 0.0005 in. thick	—	—	6.2	30
	Polyethylene and vacuum	—	—	7.1	0
	Mean	—		6.5	
0.93	None	6.1	30	6.1	20
	Polyethylene, 0.0015 in. thick	—	—	6.1	20
	Mylar, type C, 0.0005 in. thick	—	—	6.6	20
	Polyethylene and vacuum	—	—	3.2	70
	Mean	—		5.5	
2.79	None	6.7	0	5.5	40
	Polyethylene, 0.0015 in. thick	—	—	3.9	60
	Mylar, type C, 0.0005 in. thick	—	—	3.2	90
	Polyethylene and vacuum	—	—	2.8	70
	Mean	—		3.9	
4.65	None	4.7	60	3.9	70
	Polyethylene, 0.0015 in. thick	—	—	3.1	80
	Mylar, type C, 0.0005 in. thick	—	—	3.3	80
	Polyethylene and vacuum	—	—	2.4	80
	Mean	—		3.2	
Can liner mean	None	6.2		5.6	
	Polyethylene, 0.0015 in. thick	—		4.7	
	Mylar, type C, 0.0005 in. thick	—		4.8	
	Polyethylene and vacuum	—		3.9	
L.S.R. @ 0.05: Individual		1.5-1.3		1.5-1.3	
Dose mean		—		0.7-0.6	
Can liner mean		—		0.7-0.6	

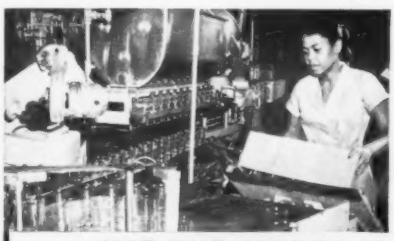

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TABLE XI

Effect of Radiation Dose, Can Liner, and Can Condition on the Flavor of Tomatoes

Dose × 10^5 rads	Can liner	Perforated cans				Sealed Cans			
		Evaluated 24-48 hr. after irradiation		Evaluated 10 days after irradiation		Evaluated 24-48 hr. after irradiation		Evaluated 10 days after irradiation	
		Flavor score	Judges who disliked (%)	Flavor score	Judges who disliked (%)	Flavor score	Judges who disliked (%)	Flavor score	Judges who disliked (%)
0	None	7.0	0	7.1	20	6.2	20	5.7	0
	30-lb. unbleached kraft paper bag	—	—	—	—	6.5	10	5.7	30
	Polyethylene, 0.0015 in. thick	—	—	—	—	7.1	0	5.6	10
	Polyethylene, perforated	—	—	—	—	5.4	20	6.5	10
	DuPont No. 322	—	—	—	—	6.0	30	5.5	10
	Mylar, type C, 0.0005 in. thick	—	—	—	—	6.0	30	6.0	20
	Mean	—		—		6.2		6.1	
2.79	None	5.5	30	4.5	40	3.7	80	3.8	60
	30-lb. unbleached kraft paper bag	—	—	—	—	4.2	60	5.0	30
	Polyethylene, 0.0015 in. thick	—	—	—	—	4.0	60	4.9	40
	Polyethylene, perforated	—	—	—	—	2.6	90	4.5	60
	DuPont No. 322	—	—	—	—	5.4	30	5.3	20
	Mylar, type C, 0.0005 in. thick	—	—	—	—	—	—	6.5	20
	Mean	—		—		4.0		5.0	
4.65	None	5.5	40	4.9	40	2.7	80	2.8	90
	30-lb. unbleached kraft paper bag	—	—	—	—	3.5	80	2.3	90
	Polyethylene, 0.0015 in. thick	—	—	—	—	2.5	100	3.0	90
	Polyethylene, perforated	—	—	—	—	2.6	90	3.2	80
	DuPont No. 322	—	—	—	—	3.3	70	3.3	70
	Mylar, type C, 0.0005 in. thick	—	—	—	—	—	—	2.6	90
	Mean	—		—		2.9		2.8	
Can liner mean	None	6.0		5.0		4.2		4.6	
	30-lb. unbleached kraft paper bag	—		—		4.7		4.3	
	Polyethylene, 0.0015 in. thick	—		—		4.5		4.5	
	Polyethylene, perforated	—		—		3.5		4.9	
	DuPont No. 322	—		—		4.9		4.7	
	Mylar, type C, 0.0005 in. thick	—		—		6.0		5.0	
Can condition mean	Perforated	—		—		—		—	
	Sealed	—		—		—		—	
L.S.R. @ 0.05:									
Individual		1.5-1.3		1.6-1.3		1.5-1.3		1.6-1.3	
Dose mean		—		—		0.5		0.6-0.5	
Can liner mean		—		—		0.8-0.7		0.9-0.8	
Can condition mean		—		—		—		0.5	

only exception was in the material, Mylar. Tomatoes in this material were judged equally acceptable at the 2.79 × 10^5 rads with those of the control. Tomatoes irradiated at 2.79 and 4.65 × 10^5 rads with aeration through perforation, were judged higher than those irradiated in sealed cans, but all were of poor quality. (See Table XI)

SUMMARY AND CONCLUSIONS

From the observations and results of the experiments reported in this paper, on the different radiation doses, can-lining materials, aeration during radiation, and condition of can, on the quality and shelf life of certain fruit and vegetable products, they can be summarized and concluded as follows:

In general, it seemed that the can-lining materials such as saran, parchment, cellophane, Mylar, and DuPont's experimental film No. 322, may have more possibility to be used during the irradiation process than other materials used. The success of the preservation of the irradiated fresh fruits and vegetables will depend upon the availability of a semi-permeable film which will allow normal respiration of the product and at the same time will prohibit the entry of microbes.

Aeration, during irradiation of fruits and vegetables, is essential to extend the shelf life as well as to retain the natural flavor of fresh fruits and vegetables by supplying O_2 for the normal respiration process and at the same time removing CO_2 and other gases given out as a result of respiration and of radiation.

Acknowledgments

The authors are grateful to Major J. P. Berg and Mr. D. L. Hunke and their staff at the Dugway Proving Ground, Dugway, Utah, and Material Testing Reactor, Phillips Petroleum Co., Idaho Falls, Idaho, respectively, for their assistance and cooperation in making the necessary arrangements for the radiation.

Literature Cited

1. Duncan, D. B., "Multiple range and multiple F test," *Biometrics*, 11 (1), 1 (1955).
2. Peryam, D. R., and Girardot, N. F., "Advanced taste-test method," *Food Engineering*, 194, 58 (1952). (*End*)

Effective redesign of interior packing goes hand in hand with improved packaging line work methods. Mr. Klecka shows how the coordinating of both (with reference to each other) affords a simple method of packaging operational improvements.

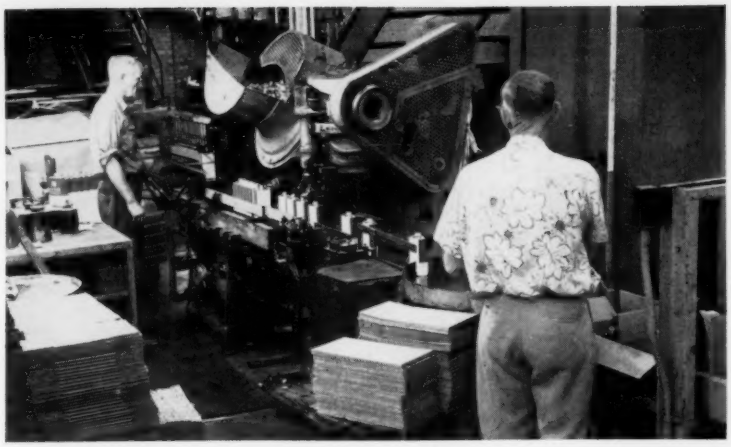


Fig. 1. While man at left tends filling machine, man at right picks up each box blank, opens it, presses in bottom flaps, spots box on case sealer infeed. He next loads each box after positioning interior packing, then guides each into case sealer.

We make one box do the work of four

By Jack Klecka,
Packaging Engineer,
A. B. Dick Company,
Chicago

By structurally redesigning our package and changing our packaging line methods, we have boosted the efficiency of our mimeograph ink packaging line. As a result, we now use only two instead of three men on our line and have a shipping package providing greater convenience to our distributors and users than our old packaging gave them.

This line fills 1-lb. F-style metal cans. Our distribution system requires that we package these in multiples of ten. Our former operation gave us individual corrugated boxes containing ten cans each, and we put each four of these 10-can units into a master container holding 40 cans. By our new method, we pack 20 cans into a case equipped with dividers so that it may be cut in two, thus giving two units of ten cans each.

Empty cans receive ink on a Pneumatic Scale vacuum filler, which handles ten cans at once. From here they move through a Pneumatic Scale capper, after which they pass a code dater of our own development. Conveyed from the capper, they move to our company-built turntable. This is a 30-in. disk moving in a counterclockwise direction. A stationary guide furnishes a build-up point to accumulate cans for the packer.

Stepping Up Efficiency

Under our old operation, one man handled can filling, another man put each ten filled and capped cans into a corrugated box, and pushed these boxes into our A-B-C case sealer. A third man put each four boxes of ten into a master shipping container, thus giving a shipping unit of 40 1-lb. cans. Also, this third man stitched the bottom and taped the top of each case and put the sealed cases on a waiting pallet.

Job of Second Man

With our new operation, a man attends the filling machine just as before. The second man picks up each box blank, opens it, presses in the bottom flaps, and positions the box on the case sealer infeed. Next he breaks the two bottom scores of the interior dividers, puts them in position, then puts ten cans in each half of the case. He next pushes each case into the case sealer.

Going through the sealer, cases move around 180° on a conveyor

Jack Klecka studied engineering at Illinois Institute of Technology. He has been associated with A. B. Dick Company for 27 years in various engineering capacities. Currently his company's packaging engineer, Mr. Klecka is a member of the Society of Packaging and Materials Handling Engineers.

Fig. 2. He breaks bottom scores of interior dividers, then positions them in box. Use of dividers permits making one RSC serve as two. Interior pieces are scored corrugated sheets.

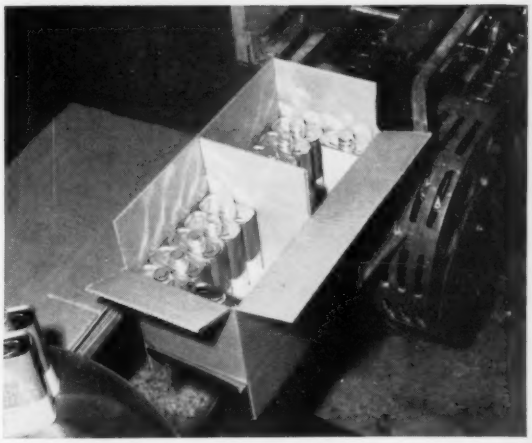


Fig. 3. Each half of box holds ten cans. After all cans are in place, interior pieces (center) are folded 90° along scores, thus creating inner flaps of each separate RSC within one RSC.

of 4-ft. radius, then slide to a backstop on an inclined section of gravity skate conveyor. At this point, the same man who puts cans into cases turns 180° himself, then picks up sealed cases and places them on a waiting pallet. He thus completes the packaging sequence. As a result, the third man is no longer needed here and has been transferred to productive work elsewhere in the plant. Under both the old and new operation, a stock man takes away loaded pallets.

One Box Serves As Two

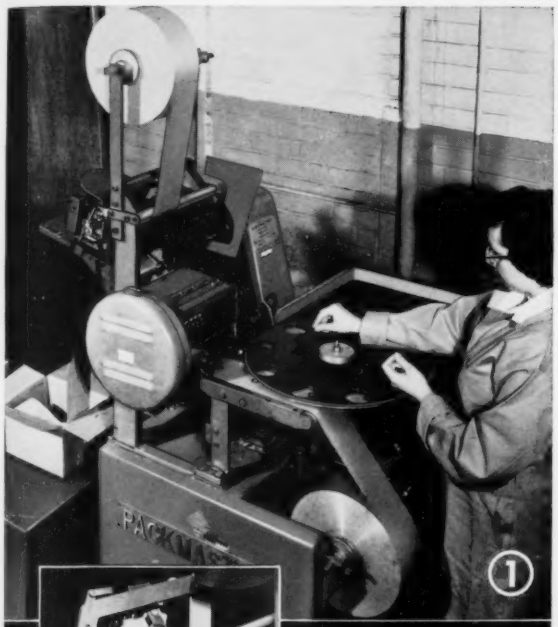
Structural design of the interior packing permits this type of operation. Under the old method, we used an RSC (regular slotted container) for each ten cans, and then had an RSC as our master container holding four boxes of ten cans each. Our present shipping box, holding 20 cans, also is an RSC. The two interior pieces are merely scored corrugated sheets which our packer positions in such a way that one flap of each sheet serves as a bottom for a row of cans and its other flap serves as a top.

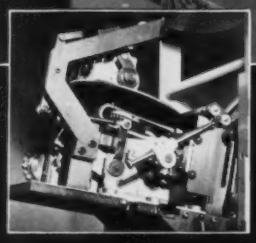
What we have done is create two RSC's within one. The folded flaps of the scored sheets are plowed down by our case sealer and the top outer flaps are glued to the scored sheets at the case center just as they are to the flaps of the case itself at the end. As a result, we have two cases in one. These boxes carry a printed perforation line. A distributor or user need only cut the box along this line and he has two sealed cases of ten cans each.

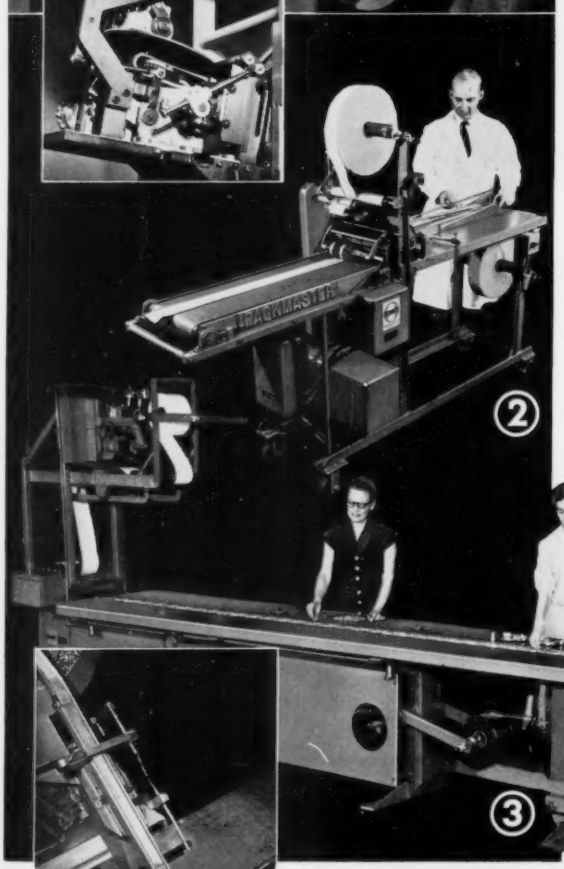
In addition to freeing one man for work elsewhere, we have gained with this operation a substantial savings in corrugated material costs. Also, we have eliminated an excess lifting load. With our former shipping container holding four 10-can units, there was a gross load of about 48 lb. We wanted to reduce this because we adhere to a policy of prohibiting any one person from lifting more than 35 lb. Thus, the 20-can cases we now use have materially eased the burden of lifting. *(End)*

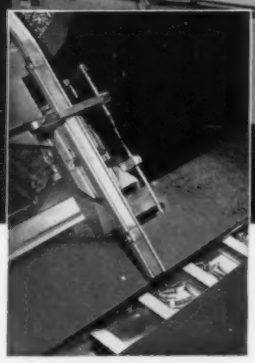
Fig. 4. Pressing down flaps of interior pieces along scores, he guides each case into case sealer at right. Once cases go through sealer, attendant turns 180°, lifts each box from conveyor, places it on pallet.

Fig. 5. Interior pieces are in same position as in box. Cans rest on bottom flaps just as on flaps of case itself. Top flaps serve as inner flaps of RSC. Cutting along perforated line makes two boxes out of one.









Here's the Sure Way to Cut Costs with Automatic Packaging

For an automatic packaging line to be a real cost-cutter, these three factors must be present: (*1.*) The machine must provide customized packaging without requiring major engineering outlays; (*2.*) it must be designed with flexibility to accommodate product redesigns or to handle runs of a variety of products; (*3.*) it must provide a quality package at a high hourly rate and low cost per unit.

Three basic models of Sundstrand-Packmaster machines enable you to choose standard machines that meet all these requirements. Whether you require a dome pack or a flat pack offering various combinations of flat and opaque sides for single or multiple items, your packaging costs will drop to a new low with a Sundstrand-Packmaster machine.

Change overs are fast and don't require skilled help because the Sundstrand-Packmaster design features fully interchangeable components that eliminate complicated adjustments.

Fig. 1 — Minimum floor space is required by Model 50 Packmaster which feeds out packages in a die cut ribbon for accordion folding or individual separation. Machines can be furnished with dial (shown) or pusher type feeder. Inset shows one of several types of optional printers available for imprinting specifications, part numbers, etc., on packages.

Fig. 2 — Long flat packages are readily handled on Model 56 Packmaster provided with loading table and belt exit conveyor. Changeover for various combinations of packaging materials is rapid. Automatic cut off feature makes possible running of various lengths of parts without any machine adjustment.

Fig. 3 — Dome packed parts can be packaged on this Model 58 Packmaster manually or using automatic loading as shown in inset. Thermo formed domes serve as parts conveyor as work moves along line. Domes can be shaped to fit closely over single parts or handle a number of smaller pieces.

Additional data is available on Sundstrand-Packmaster packaging machines. Write for further information today.

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Ann Arbor, Michigan

SUNDSTRAND

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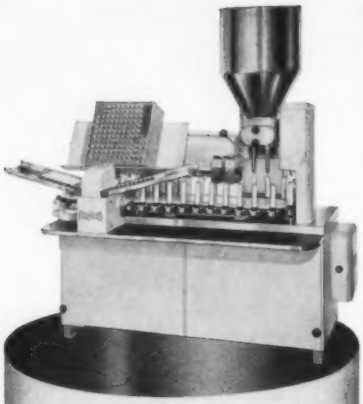

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"Assist frames" speed up skin-packaging operation

Specially built frames equipped with permanent guide wires fit into clamping frame on machine

By Harry D. Lawrence,
Director of Engineering,
Dowst Manufacturing Company,
Chicago

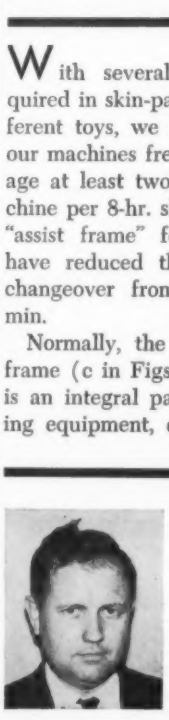
Averaging at least two size changeovers per machine per 8-hr. shift, a great deal of production time was lost by having to re-position the guide wires in the clamping frame of the skin-packaging machine. As Mr. Lawrence explains, the use of "assist frames" to replace this method has reduced changeover time from about 50 to 5 min.

With several sized cards required in skin-packaging many different toys, we must change over our machines frequently. We average at least two changes per machine per 8-hr. shift. By having an "assist frame" for each size, we have reduced the time for each changeover from about 50 to 5 min.

Normally, the regular clamping frame (c in Figs. 1 and 3), which is an integral part of the packaging equipment, contains wires for guiding the hot film between the products positioned on the master sheet. These wires cross one another at right angles and are spaced properly for the particular size of the items being packaged.

Four Standardized Card Sizes

We use four sizes of cards which handle all of the size variations found in the toys we skin-package. We standardized these four sizes in such a way that any of them can be laid out on a single-sized



Harry D. Lawrence attended Illinois Institute of Technology for several years. Prior to joining Dowst about six years ago, he was a master mechanic with Davidson Corporation, subsidiary of Mergenthaler Linotype Company, and was in tool design and tool-making with Victor Adding Machine Company. He is a member of Society of Die-Casting Engineers.

Circle No. 235 on Card

For more information circle No. 236 on Card

Packing station at Land O'Lakes Creameries, Inc., Thief River Falls, Minnesota.

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When Land O'Lakes Creameries, Inc. changed to a liquid freezing process on their fine Oven Ready Turkeys, a special container was needed that "Doubled in Brass" . . . held turkeys for final freezing and served as a shipping container.

Enter a Hoerner Packaging Engineer working right in the Thief River Falls, Minn. plant of Land O'Lakes to solve the problem. His recommendations and designs resulted not only in a double-duty container but eliminated two handling steps with a resultant saving in time and money.

Prior to using the liquid freeze process, Land O'Lakes froze turkeys by blast freezing. Birds were bagged, placed individually on freezing racks, fork-lifted into blast freezers. Once frozen, they were boxed and shipped.

In the liquid freeze process birds moved from the bagging operation directly to liquid freezing tanks which serve to set the natural color of the bird but do not completely freeze the bird. From the tanks the birds are put in holding freezers to complete the freezing operation.

The Hoerner Packaging Engineer designed a container with two inch diameter offset holes, die-cut in sides and top and bottom of box. The holes are aligned when the bottom is placed in the inverted top, allowing for circulation of sub zero air. Thus it becomes a double-strength carton to hold birds for final freezing. When ready for shipment, the covers are reversed, ergo, the holes are not aligned, the container is completely closed for shipping. Truly a packaging job that doubles in brass.

The costly freezing rack operation with its handling and rehandling of turkeys was eliminated. Obviously, the elimination of these two steps resulted in time and cost savings to Land O'Lakes.

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master sheet, 29x33 in., with a minimum board loss. The four individual card sizes, the number of each per master sheet, and the number of wires required in the frame for each are:

Card Dimensions (in.)	Arrangement and Number per Master	Number of Wires
4x5½	7x6	11
4x7	8x4	10
4x10¾	7x3	8
7x10¾	4x3	5

Note that from 5 to 11 wires per machine had to be re-positioned in the clamping frame for each size change which required approximately 50 min.

Builds "Assist Frames"

We asked ourselves: Why not have frames which could be fastened inside the regular clamping frame, each to contain the necessary number of wires arranged for a given sized package? Obviously, there was no apparent reason that this would not be satisfactory; so, we made the necessary assist frames (a in Figs. 2 and 3) which we currently use.

One frame for each card size. The frames are constructed of 1x2-in. angle iron, welded together for rigidity. The outer size of each is such that it fits easily, but snugly, inside the clamping frame of the machine. They are held in place by four bolts (b in Fig. 3) which permit fast changes. Each frame is wired for a specific sized card and proper arrangement as shown in the chart above. We have a set for each of our skin-packaging machines.

Reduces Changeover Time

To make the rapid changeover from one size to another, it is only a matter of removing the four bolts which hold the assist frames in the regular clamping frame, inserting the proper frame, and bolting it in place. The time required for this is about 5 min., as compared to 50 min. previously. **So, we have gained an average of about 1½ hr. of production time per 8-hr. shift.**

(End)

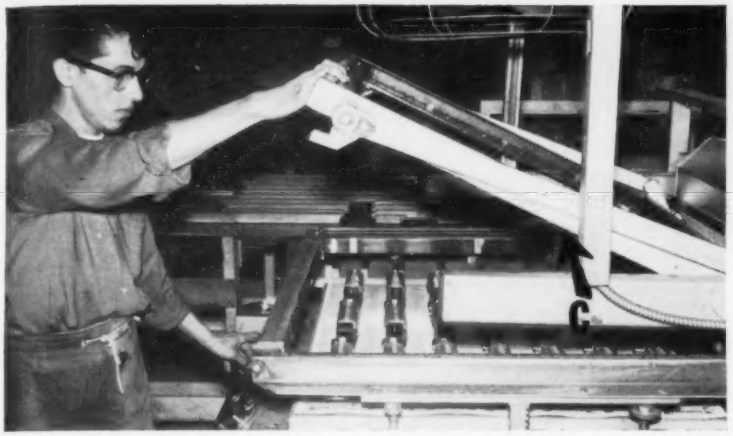

Fig. 1. Top view of skin-packaging machine. Note regular clamping frame (c) which normally contains wires for guiding hot film between products. From 5 to 11 wires per machine had to be re-positioned for each size change which required about 50 min. With "assist frames" (see Figs. 2 and 3), this change requires about 5 min.

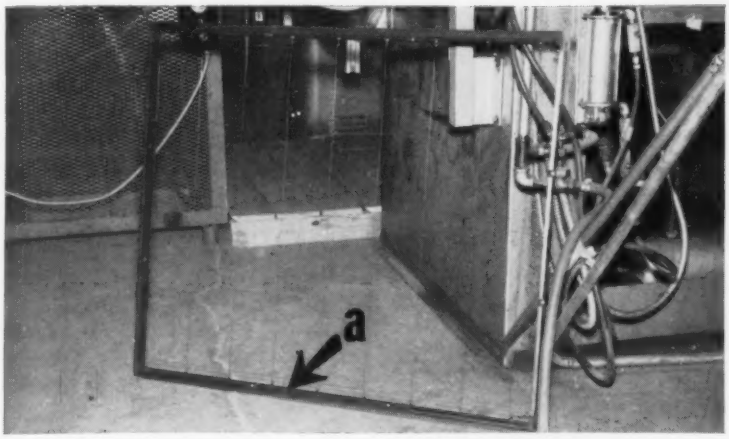

Fig. 2. "Assist frame" (a) which fits easily, but snugly, inside regular clamping frame. Each frame is wired for specific sized card and proper arrangement of products on master sheet. There is one set of frames for each machine.

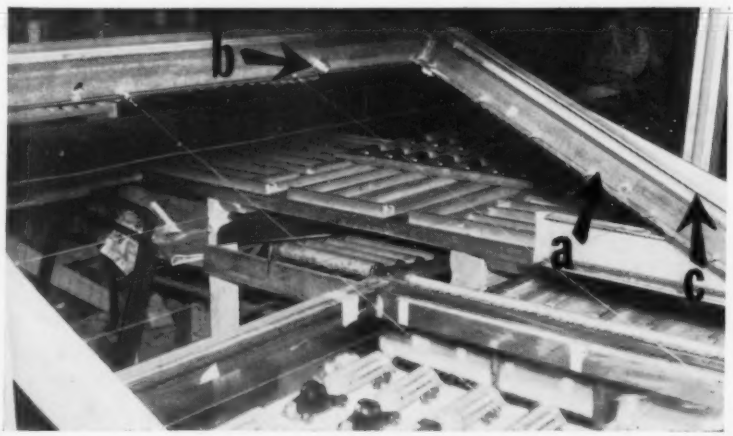

Fig. 3. Close-up of regular frame (c) with "assist frame" (a) positioned inside. Note four bolts (b) holding assist frame in place, which allows fast size changeovers.

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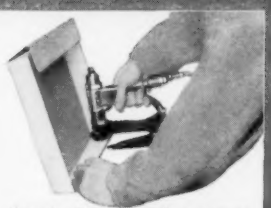

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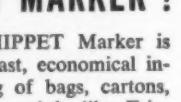

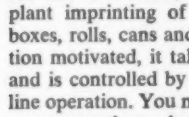

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FPL structural design work rests on 50 years' research

By Keith Q. Kellicutt,
Engineer,
Forest Products Laboratory,*
Forest Service, U. S. Dept. of Agriculture,
Madison, Wisconsin

Since fibreboard boxes are usually made of processed wood fiber, the Forest Products Laboratory has been keenly interested in providing methods of pulping woods that can be utilized in their manufacture, and in developing in the finished fibreboard box all of the inherent strength of the paperboard sheets from which it is made.

Historical Background

"The first recorded laboratory tests for the improvement of shipping containers were made in 1905 by the Forest Service in cooperation with Purdue University, Lafayette, Ind. Purpose of these tests was to determine the merits of different kinds of wood as box material . . . After the establishment of the Forest Products Laboratory at Madison, Wis., in 1910, research on container design was greatly expanded and centered at this laboratory, where special testing machines and methods of testing have been developed.

"Chief endeavor of the laboratory in connection with shipping containers has been to develop fundamental principles of design and relationships of the various details necessary to produce containers that are balanced in strength" *(2).*

Such early FPL researchers as Don L. Quinn, who later founded his own testing laboratory in Chicago, C. A. Plaskett, and T. A. "Tac" Carlson, all now deceased, recognized the potential of the corrugated fibreboard box and the need for developing basic design criteria similar to those which had been developed for wood shipping containers *(1).* Although actual testing of fibreboard containers at the laboratory dates back to before World War I, and later in conjunc-

*Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

Here is the background of research underlying Mr. Kellicutt's series "Structural Design Notes for Corrugated Containers." Here he reviews some early history and gradual development of box testing. In his series of notes, he will cover testing techniques that have been developed for evaluating the component paperboard sheets. His notes will include typical physical strength values of various grades. Subsequent notes by Mr. Kellicutt will relate to tests and the properties of the built-up board as well as the relation of their strength properties to the component paperboard sheets. Finally, his series will tie together the properties of the component sheets and the built-up board to the finished box. He also plans to cover factors affecting the strength of the finished box and will cite important aspects for consideration when preparing specifications. His Note No. 1 appears on page 76.

tion with the development of the hexagonal testing drum, the real work to make scientific design of fibreboard boxes possible didn't start until the early thirties.

Plaskett and Carlson, working as a team, sought to develop meaningful tests of basic paperboard components that could be correlated with the strength properties of the board and finally with those of the box. The project had only been started when Plaskett died in 1935, leaving Carlson to guide the work alone. His laboratory assistant at the time was K. E. "Scotty" Skidmore, who has worked on various container projects at the laboratory since 1917 and, since 1933, almost continuously on various phases of fibreboard research.

Having developed or applied such tests as the tension test for studying the physical properties of fibreboard components and bending, column, and shear tests for evaluating the board, the next step in development of design data was to relate the properties of the paperboard sheets and board to the final structure: a fibreboard box. "Tac" developed the Carlson score tester for evaluating the score lines of the box but eliminated their influence in the initial work by working first with the tube. **The tube having square cut edges represents the ultimate in compression strength that can be developed from a combination of materials.**

Corrugator Installed

In the early phases of work on corrugated board, **it became apparent that a close control over manufacturing variables needed to be maintained and the variables introduced and studied one at a time.** For this reason, a 52-in. commercial-type corrugator was installed for manufacturing both A-flute and B-flute corrugated board for use in the study.

Installation was made in 1935 and used until recently, when it was disposed of in favor of a new single facer to go in operation early this year. The new single facer has the latest innovations and will be

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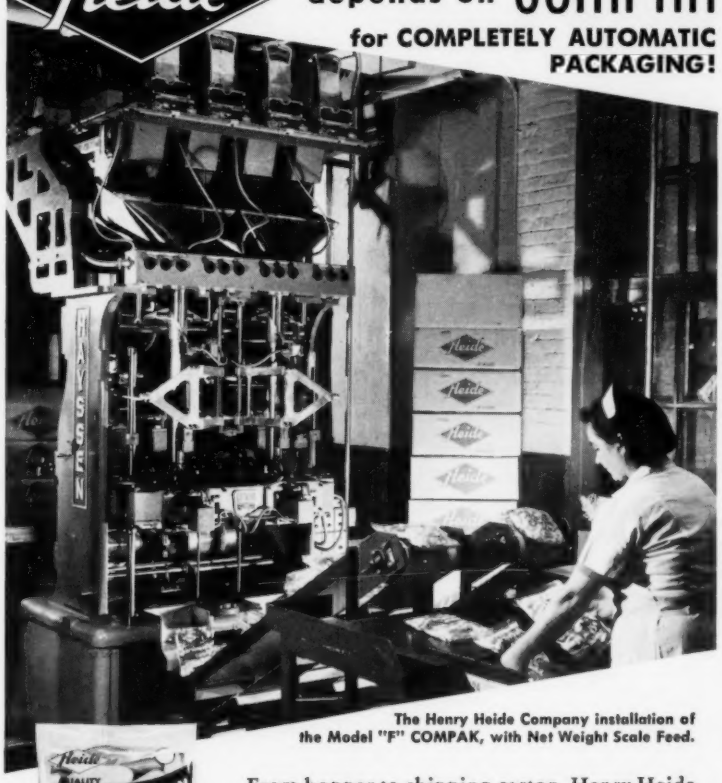

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Keith Q. Kellicutt is a graduate of The University of Wisconsin, with a B.S. degree in agriculture. He has also studied radio mechanics and electronics. Since 1944 he has been associated with the U. S. Forest Products Laboratory. A member of Forest Products Packaging Council and American Society for Testing Materials, Mr. Kellicutt is chairman of ASTM's subcommittee on interior packing.

capable of operating at speeds of 1,000 lineal ft/min. The machine will make possible more complete investigations of manufacturing techniques and will be available for cooperative research with industry.

Tests Of Components

Fibreboard research was interrupted late in 1941 by World War II and was resumed in 1947. Upon resumption, the original objectives of the study were not changed, but where the study had been originally supported by Forest Service research funds it was resumed in cooperation with the Quartermaster Food and Container Institute for the Armed Forces. This cooperation was continued for several years, and considerable progress was made during the period.

Emphasis was placed on application or development of simple tests of component paperboards with which containers could be specified for certain applications. The plan was to use more precise testing techniques, such as tension, bending, column, and shear tests, to evaluate simple tests. One such simple test that was used is the ring crush test of paperboard. It yields a single value, that of maximum crushing load.

However, a method was developed with which the top-to-bottom compressive strength of fibreboard boxes of any size or shape could be predicted from the ring crush values of the three paperboards from which the box was made. These compressive strength values can be interpreted in terms of moisture content of the fibreboard and projected in terms of how much dead load the box can be expected to support during a storage period involving specific moisture conditions.

Industry Participates

During initial phases of fibreboard research, work was done on corrugated board that had been fabricated on the laboratory corrugator from paperboards that were furnished by industry. Later, commercially made board and boxes were obtained from leading manufacturers in various geographical locations of the United States in order to determine if the design criteria that had been developed would apply to commercially made boxes as well as those made in the laboratory. Full cooperation has

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been received from industry in this regard.

More recently, work has been done on boards that were manufactured on the laboratory corrugator from paperboards made on the laboratory paper machine. Thus, control is maintained from the wood chip to the finished box.

The Packaging Research Division of the FPL disseminates its research findings for general use. This is accomplished by issuing publications,† presenting talks at technical society meetings, answering inquiries, and preparing articles for publication in journals.

Literature Cited

(1) Champion, F. J., *Packaging Research at the U. S. Forest Products Laboratory*, (Forest Products Laboratory), Report No. 2064, September, 1956.

†List of publications on box and crate construction and packaging data, U. S. Forest Products Laboratory Report No. 791. Single copies available free on request to Director, Forest Products Laboratory, Madison 5, Wis.

(2) Plaskett, C. A., *Principles of Box and Crate Construction*, (U. S. Dept. of Agriculture, 1930), Technical Bulletin No. 171, 132 pages, illustrated. (*End*)

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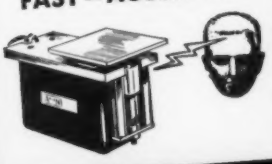

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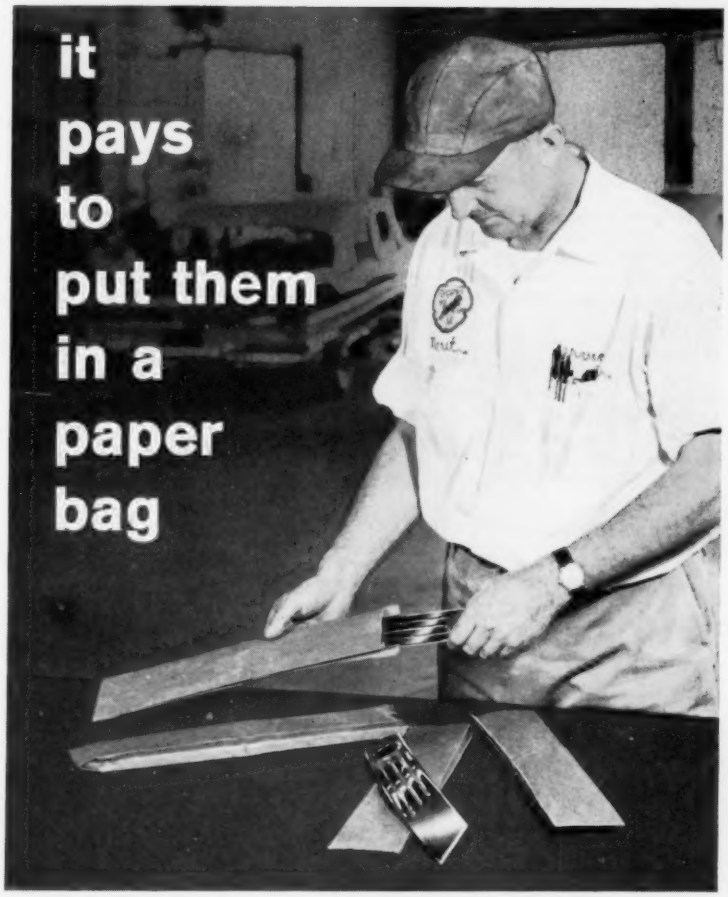

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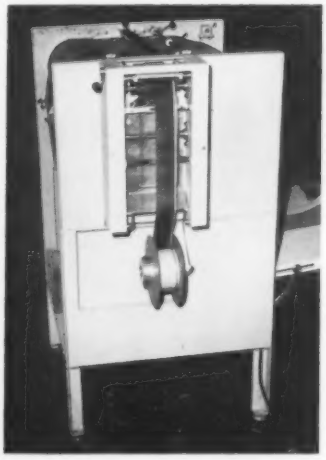
Carton End Gluer

Alford Package Machines, Inc., announces development of a carton end gluer for moderate production runs. The unit, called Minisealer, produces pilfer-proof packaging. It occupies 4 sq. ft. of space and weighs under 100 lbs. The machine produces 1,000 units/hr. with one operator. Loaded cartons are fed into the machine, then automatically glued and delivered sealed, ready for case loading. The stainless steel unit is powered by air or electricity. Circle No. 1.

Shipping Stencil Tabber

Weber Marking Systems has developed a machine for tabbing shipping stencils on continuous forms. Called the Tabber Model



300, the machine places shipment addressing stencils over the address section automatically at an adjustable speed of up to 2,400/hr. It counts the forms as they are tabbed. The unit is said to eliminate manual operation of tabbing stencils on forms. Circle No. 2.

Pinpoint Valve

The Karl Kiefer Machine Co. has designed a new stem casing which pressure fills to an exact level in any type of container without the use of a seal. Featuring split-second cut-off of flow, accomplished through rapid action of a vacuum liquid level control, the unit may be used on plastic bottles, sanitary cans, regular and wide mouth bottles, and various sizes of jars. The Pin Point valve is said to fill without exerting any sealing force on the container or creating pressure or vacuum within. Circle No. 3.

Moisture-, Greaseproof Board Coating

Mead Board Sales and Mead Containers, Inc., has available a type of corrugated board incorporating a moisture- and greaseproof polyethylene coating. The coating (U. S. Industrial Chemical Co.'s Petrothene resin) is usually applied inside of the eventual container and in such cases the polyethylene-coated kraft is applied to the single face side. However, the polyethylene-coated board can be run on the opposite side (double backer) of the combined board as well, Mead says. Circle No. 4.

Semi-Automatic Horizontal Cartoner

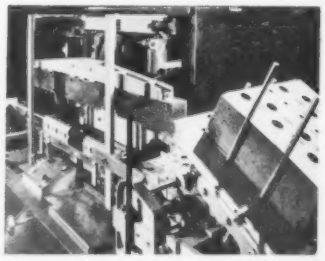
R. A. Jones & Co. announces a semi-automatic horizontal cartoner, Model CMH, designed for loading products into cartons horizontally. Speeds of from 20 to 120 cartons/min. can be attained on this unit, which accommodates either a tuck or a glued-end carton. Except for sliding the product into the end of the carton, operation is completely automatic, including carton feeding, opening, and sealing. The unit features a wide range of adjustability and quick changeover. It can be adapted for thermosealing a cold wax carton for frozen foods. Circle No. 5.

Bag Closure System

Chase Bag Co., Paper Bag Div., announces the Chase Moistite bag closure system, which features moistureproof closing of both ends of bags containing products which require maximum moisture protection. The equipment uses a special tape, adhesive, and method of application to achieve the closure. Closure speed is rapid enough not to scorch paper or melt a polycoated inner sheet, Chase says. Circle No. 6.

Multipacker Unit

Container Corp. of America announces the Wrapak 70, a multipacker for handling a variety of cans, bottles, and jars at speeds up to 70 cartons/min. in single or double line. The machine forms a 2- to 12-unit carton in sizes up to 18" long and 6-5/8" wide;



heights up to 8-3/4". This completely automatic unit is said to be convertible in 30 min. to handle different size bottles, jars, cans, and cartons. Feeding the carton hopper is the only manual operation necessary and the machine stops itself when cartons or products are depleted. Circle No. 7.

Foil Container Closer

Kaiser Aluminum & Chemical Sales, Inc., has designed an automatic die-closing machine for aluminum foil containers using board or rigid all-foil lids. The unit, ACM-200, operates at speeds up to 60 containers/min., depending on product viscosities. It features positive indexing into and discharge from the closing die. The machine operates on mechanical principles and has no compressed air, hydraulic, or electronic devices. Circle No. 8.

Formable Paper Materials

Cincinnati Industries, Inc., an-

NOW sterilization molded to your needs

CASTLE ENGINEERED STERILIZATION

CES Offers Technical Assistance In Evaluating Your Package for Sterilization

Why let packaging problems stand in the way to more efficient and economic sterilization?

CES places at your disposal a modern sterilization laboratory—one of the few of its kind in the U.S.

Here CES evaluates your package . . . then recommends the best sterilizing procedure for your present package.

Or CES may recommend a packaging change to conform to more efficient methods of sterilization.

Castle engineers are prepared to offer practical solutions to any sterilizing problem: from permeability to methods for developing terminal sterilization.

Send your packaging sample, with production data, to CES. Test results forwarded FREE OF CHARGE. This is another service of CES—molding sterilization to your needs.

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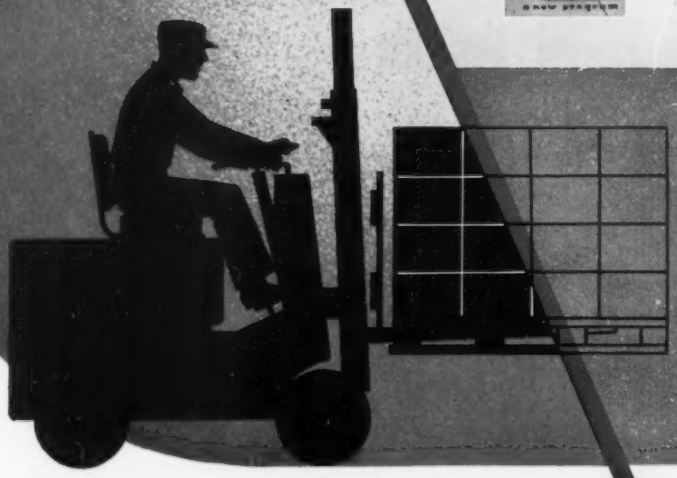
Shows how CES helps solve your sterilization problems. Presents latest developments in dry heat, steam and GAS.



NEW: Now CES makes gas available for terminal sterilization. This process enables gas to penetrate and sterilize the contents of sealed packages. The CES brochure supplies complete details on the economic use of gas sterilization.

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NO need to OVERFILL with COLTON LIQUID FILLERS

Patented metering cylinder and valve.
Adjustable fills, accurate to ±½%.
3 cc. to 1 qt.
4 to 480 fills per min.
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Complete AEROSOL production line equipment and paste fillers.

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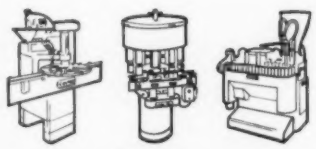

MULTIPLE LIQUID FILLER | ROTARY AEROSOL LIQUID FILLERS | PASTE FILLER

nounces a new use for its crepe paper which possesses a high degree of all-directional stretch, whereby it can be combined with thermoplastic materials and formed into compound shapes which may have ultimate use as food containers. Using conventional forming processes, these combinations in various numbers of plies can be stretched as much as 60% without breaking. Most work to date has been with high-impact polystyrene, but other thermoplastics are being evaluated. Circle No. 9.

Carton Scorebend Tester

Hunter Spring Co., Apparatus Div., has designed a scorebend tester to measure the force required to break open flat folded paperboard cartons. The instrument was developed to enable users of automatic cartoning machines to specify cartons to a recognized standard and to discover "tough" cartons before they can cause filling line slowdowns and stoppages. The tester employs a precision direct-reading force gage, which is mounted to accommodate folding cartons up to 22" wide when flat. In testing, the flat carton is inserted on edge between grooved base and notched compression head of gage. The inspector turns a knob to depress the gage and force the carton open. An indicator shows the actual opening force exerted. Circle No. 10.

Polyethylene Package Opener

Continental Can Co. announces Cut-Cord, an "easy-opening" feature for polyethylene packaging employing a dacron cord set into the film. Offered in any polyethylene extrusion lamination in both roll and pouch form, the Cut-Cord can be furnished imbedded in the surface of the poly coating, placed between the coating and the material to which the coating is applied, or pouches can be fabricated with the cord sealed into the side seals of the pouch. Circle No. 11.

Hot Melt Adhesive Applicator

United Shoe Machinery Corp. has developed Thermogrip applicator, Model CN, for installation on parent machines processing continuous webs of material. The applicator feeds, melts, and applies cord-like adhesives through a nozzle. Mechanical drive for the unit is taken from the base machine and in a ratio that maintains adhesive output proportionate to material speed. Thickness can be controlled and the adhesive may be applied up or down, in one or more bands. Heat controls are adjustable. Circle No. 12.

For more information circle No. 247 on Reader Service Card

are you still designing square packages for round products?

LET KEYES PRODUCT DEVELOPMENT ENGINEERS SHOW YOU HOW MOLDED CONTOUR PACKAGING CAN CUT COSTS, BREAKAGE

Molded pulp is the one inexpensive packaging material that combines rigidity with remarkable cushioning properties. Contour packaging eliminates fillers and dividers, cuts packing costs to a minimum. Molded pulp contour packaging facilitates automation . . . reduces cubage, saving valuable warehouse and shipping space.

Keyes molded pulp contour packaging has solved shipping and breakage problems for dozens of hard-to-package products including eggs, glassware, fruit, lamps and electrical parts. This experience, together with complete, modern production facilities means that Keyes can develop and produce for you custom designed packaging that cuts costs, reduces breakage.

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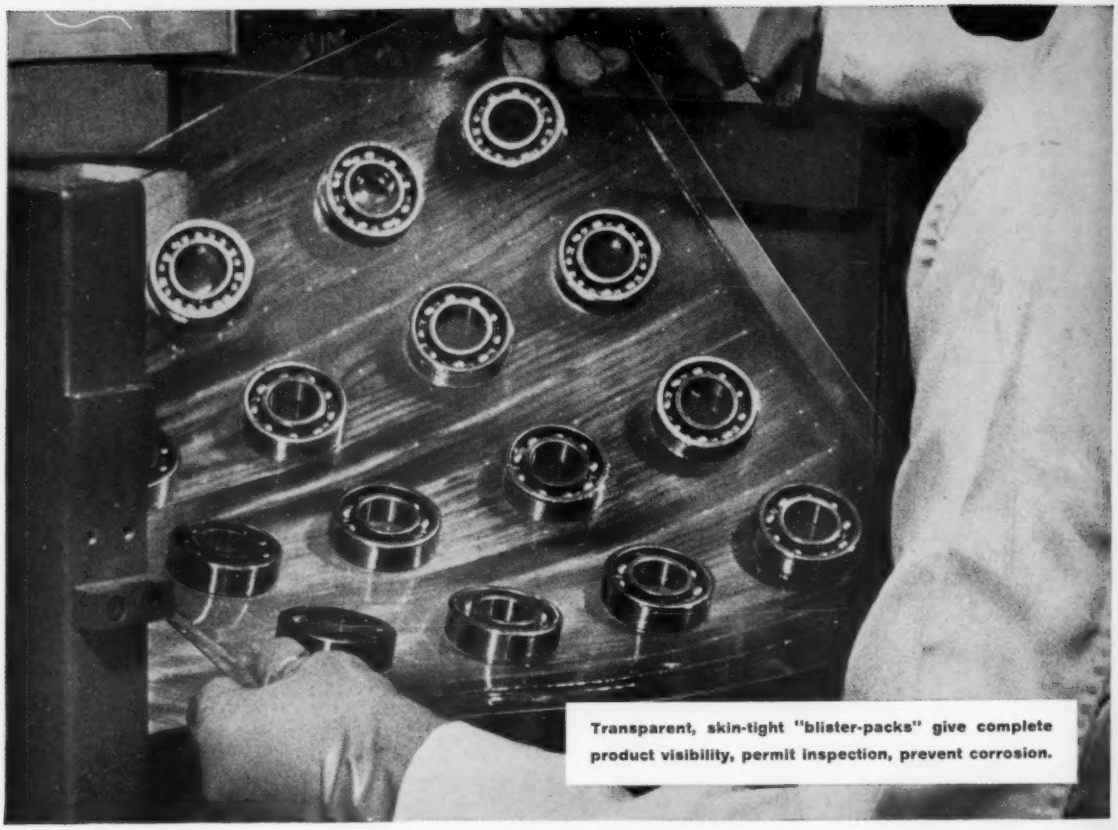


Transparent, skin-tight "blister-packs" give complete product visibility, permit inspection, prevent corrosion.

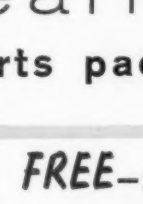
New Navy Specification for Packaging Bearings

...creates innovation in spare parts packaging

A new U.S. Navy specification for packaging bearings in transparent acetate "blisters" is expected to result in a 20 to 30 per cent reduction in packaging costs, and savings of hundreds of thousands of dollars in maintaining stock in serviceable condition. In a skin-tight, dust-free transparent "blister," a bearing may be inspected visually without opening the package. Thus no "contaminants" can enter the package and mix with moisture to create corrosion, the former major cause of bearing unserviceability. Vacuum-formed of Celanese Acetate sheet, with the bearing itself acting as the mold, the blister package is solvent-sealed with a preservative enclosed. Vacuum-formed acetate is adaptable to swift mass-production techniques, using fully automatic or semi-automatic machinery. Acetate can be contoured to provide a tight, rigid fit, and it can package several products individually in one container, as with these bearings. Thus Celanese Acetate offers an innovation in packaging methods in the *spare parts industry*. Celanese Acetate, with its excellent aging characteristics, withstands heat, humidity, and dryness, is highly grease-resistant, and performs even under adverse conditions of shipping, long-storage, and display. And—it's economical. Celanese Acetate will do an excellent job for you in your Spare Parts Packaging Program. Celanese®

FREE—Send for:

1. A copy of Military Specification #MIL-T-21484 (SHIPS) 5 Sep. 1958, for packaging bearings in transparent acetate blisters.

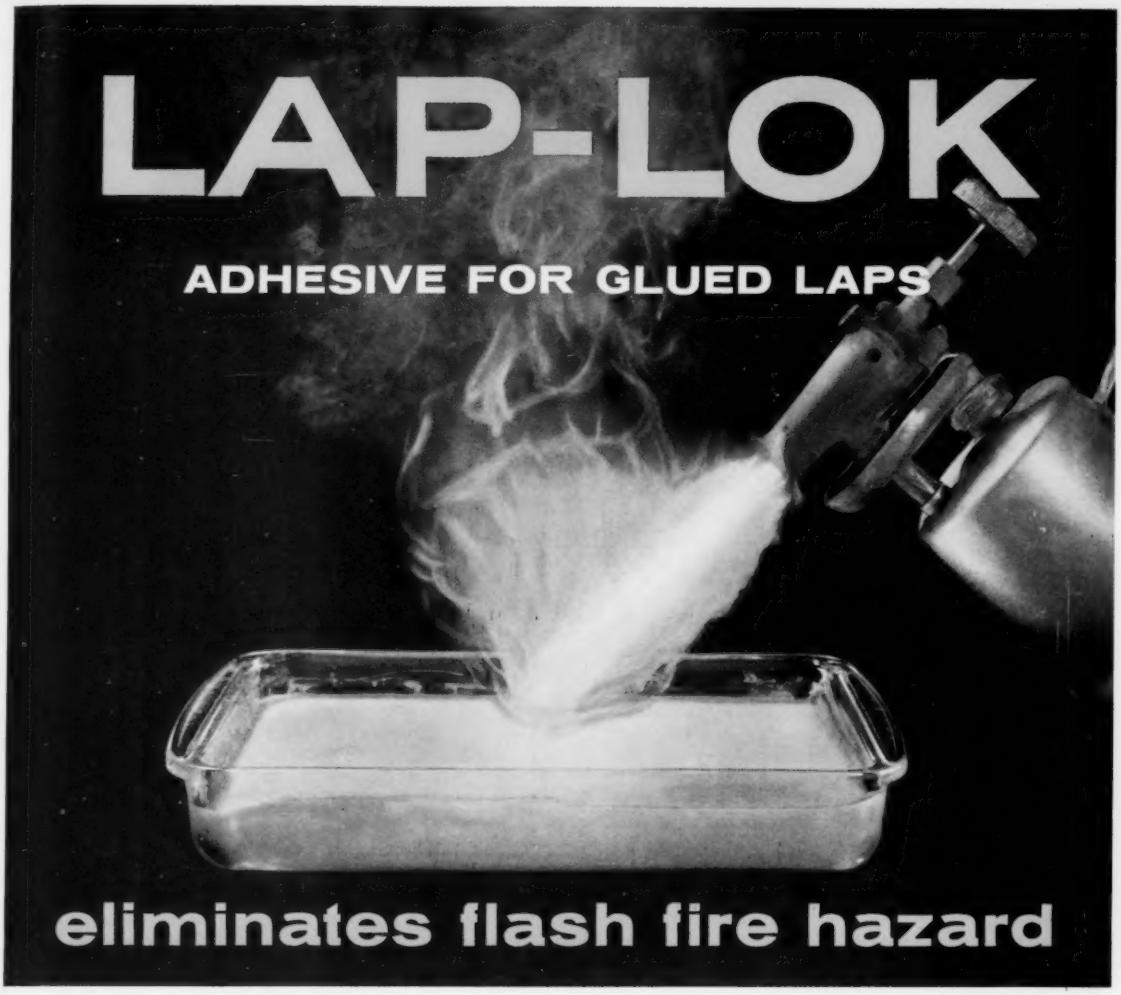


2. Celanese Bulletin B-13—"Forming of Cellulose Acetate."

Vacuum-Formed Celanese acetate sheet

CELANESE CORPORATION OF AMERICA, PLASTICS DIVISION, DEPT. 105-B 744 BROAD STREET, NEWARK 2, N. J.

Canadian Affiliate: Canadian Chemical Company, Limited, Montreal, Toronto, Vancouver • *Export Sales:* Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Avenue, N.Y. 16, N.Y.



LAP-LOK is a resin adhesive for glued laps that contains no flammable solvent. No benzene. No toluene. Completely safe. Worthwhile insurance against flash fire explosions.

LAP-LOK has other important advantages. It dries to a clear transparent odorless film. Leaves no unsightly squeeze-out. Too, LAP-LOK safeguards against heat failure. Withstands blistering summer boxcar heat when many adhesives in common use would fail.

LAP-LOK has been in trouble-free use for over four years. Wouldn't a point by point comparison with the adhesive you're now using make good sense? We'll gladly send a sample and data. Write or telephone your nearest National office.

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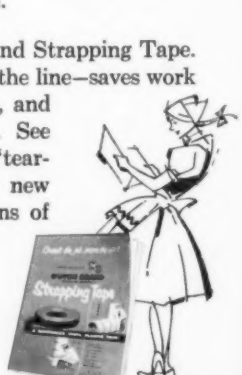
Adding 270 lbs. of carton-strength with J-M Dutch Brand Strapping Tape

Dutch Brand Strapping Tape multiplies many times the weight a package can carry . . . keeps goods safe during shipment. Tough vinyl backing and strong glass strands give this strapping tape a tensile strength of 270 pounds per inch of width.

One man can apply Dutch Brand Strapping Tape with a simple hand dispenser. The pressure-sensitive adhesive holds quickly, even on irregular surfaces . . . permits using short strips instead of wrap-around lengths. Dutch Brand Strapping Tape comes from the roll cleanly, without splits. Resists abrasion. Not effected by rot, water, oil, or grease. Can be imprinted if you wish.

Investigate Dutch Brand Strapping Tape. See how it saves time on the line—saves work in packaging, palletizing, and bundling – saves money. See why it makes an ideal "tear-strip." Write today for new "idea book" giving dozens of profitable uses.



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Package Conveyor Belts

B. F. Goodrich Industrial Products Co. has published a new data sheet on its cleated package conveyor belts. It features a ribbed design for "Griptite" belts that is self-cleaning and designed for use wherever packages range from very heavy to extra lightweight. Every 18", a rib, or cleat, raised higher than the rest, stops lightweight packages from sliding. Circle No. **101.**

Bench Counting Scale

Douglas Homs Co. offers information on its double ratio bench counting scale, Model 105C, with ratios of 1:10 and 1:50. This portable unit is equipped with two counting scoops and a platform scoop, and features full capacity beam and all-steel construction. Circle No. **102.**

Plastic Tubes And Vials

Flex Products Corp. offers a 4-page catalog price sheet on a wide selection of acetate vials and tubes. Available in threaded or shell types, these packages can be made in a variety of diameters and lengths and can be printed in colors. Various styles of closures are also available. Circle No. **103.**

Bottom Coder For Nesting Cups

Anderson Bros. Mfg. Co. offers data on its Model 78 bottom coder for imprinting the underside of all types of nesting cups. This coding device will provide for six character coding in one line, with characters measuring 1/4" high. The machine features interchangeable coding heads. Circle No. **104.**

Volumetric Rotary Fillers

Frazier & Son lists specifications and provides operating details on the rotary Whiz-Packer filling machine in a current illustrated data sheet. Handling dry products, this is a high-speed filler designed for handling containers with restricted openings, for filling products requiring settling to give a tight pack, and for eliminating product dust, assuring clean filled containers with no spillage. Circle No. **105.**

Dehumidification Equipment

Abbeon Supply Co. has published Bulletin No. 512, "1958-1959 Facts About Dehumidification for Industrial Plants, Warehouses, Stockrooms, and Laboratories, and Home Requirements." The bulletin shows equipment used to measure humidity and to dehumidify various sized areas. Photographs, prices, and specifications on a number of these machines are included. Circle No. **106.**

Automatic Weigher & Filler

Richardson Scale Co. offers Bulletin H-2 on its Holm Model GF weighing and filling machine for the packaging of free-flowing materials. Designed for small-scale weighing and packaging operations, it handles from 18 to 20 weighings/min. Specifications and descriptions of component parts are included. Circle No. **107.**

Carton Set-Up

Container Stapling Corp. offers a specification sheet on its Model C-F, King-Size clipper machine. Completely mechanical, a touch of the toe transmits treadle motion through a toggle system, sending the clip-driving head to the carton. Gravity return of the clip-driving head and foot treadle eliminate downtime due to spring fatigue, Container says. Weighing 66 lbs., Model C-F is both lightweight and portable. Circle No. **108.**

Plastics Catalog

Cadillac Plastic & Chemical Co. offers a comprehensive 64-page catalog of plastic sheets, rods, tubes, films, and lay-flat tubings. Also listed are cements, pigments, and miscellaneous supplies. Included in the catalog are sizes, weights, color ranges, textures, purchasing specifications, grades, and prices of all items. A two-page comparison table of chemical, electrical, and mechanical properties of plastic materials is included. The catalog offers easy comparison of properties of such materials as acetate, acrylic, butyrate, Impiex, Kel-F, Mylar, nylon, phenolic, polyethylene, high impact styrene, Teflon, and vinyl in cast, extruded, and laminated shapes. Circle No. **109.**

Heavy-Duty Packaging

Tri-Wall Containers, Inc., lists the advantages of its Bulk Pack in a current illustrated bulletin. Made of triple fluted corrugated board, these bulk containers are strong, yet reduce tare. They are designed to handle chemicals, plastics, machine parts, textiles, produce, etc. Circle No. **110.**

Static Electricity

Simco Co. specializes in the elimination of static electricity found in wrappers, rewinders, etc. An interesting information sheet on this subject, called "Static Can Be Fun," is available, which describes the nature of static electricity and how a Simco static eliminator can neutralize any type of material at high production speeds. Circle No. **111.**

Rotary Vacuum Filler

U. S. Bottlers Machinery Co. offers a 16-page catalog that gives detailed specs for its rotary vacuum filler, available in 14 adaptations of 6 basic models. Mechanical drawings and detailed photographs explain the operating features of each unit of this equipment that is designed to handle liquids and semi-liquids. Speed ranges for these models vary from 12 to 300 min. Circle No. **112.**

Production Data Paperwork

Addressograph-Multigaph Corp. offers an 8-page gatefold bulletin which outlines the advantages of Multigraph methods which may be applied to all types of production paper work, producing records for planning, scheduling, assembly, payroll, and costing. This system enables production data to be written once and then reproduced on any type of paper or card stock in any quantity or size for use in various plant departments. Circle No. **113.**

Heavy-Duty, High Capacity Feeders

Syntron Co. has complete information on its new heavy-duty, electromagnetic vibratory feeders especially designed for high capacity feeding where installation space is limited. The feeders combine two standard electromagnet drive units to provide the power necessary to

TEMP-R-TAPE®

Apply TEFLON* in seconds

End Sticking on heat sealing bars, flat plates, forming dies, guide rails, chutes. Just press Temp-R-Tape (pressure-sensitive Teflon tape) into place as shown above. Odorless, tasteless, non-contaminating. Good −100°F to 500°F. Recommended by film, paper and machinery producers.

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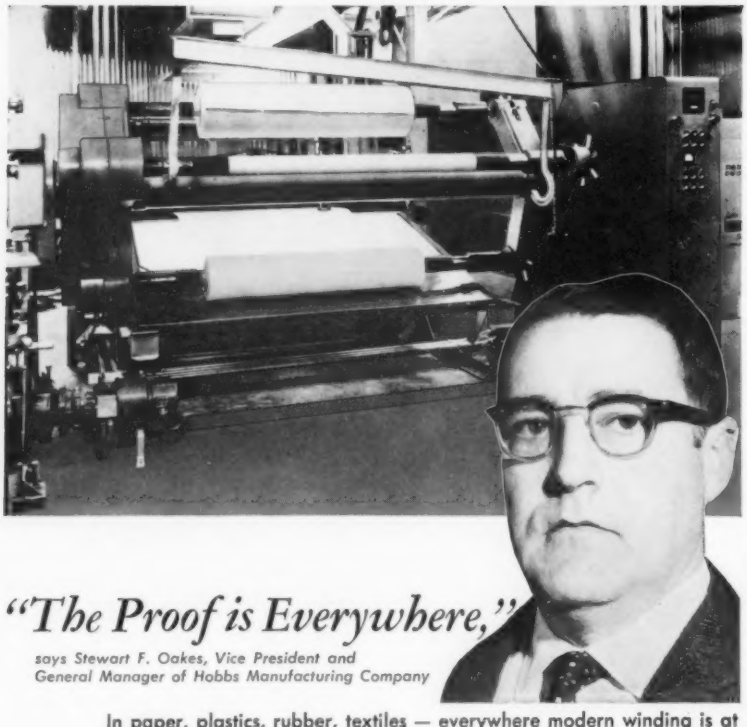
Controlled Tension Winding means:

MORE FOR YOUR MONEY



"The Proof is Everywhere,"

says Stewart F. Oakes, Vice President and General Manager of Hobbs Manufacturing Company

In paper, plastics, rubber, textiles — everywhere modern winding is at work — you'll find the Hobbs approach to center shaft winding giving more for the money . . . and for sound, practical reasons.

Constant horsepower which equals constant tension is the basic principle of tension control winding. Horsepower is in this instance a function of speed and torque . . . more torque being put out at less speed and vice versa. The end result of constant tension winding is a better, more salable package obtained with an absolute minimum of processing operation.

Whatever you wind or unwind, get more for your money with a Hobbs installation engineered to your special needs.

Get "Principles in Modern Winding", a new 20-page definition of constant tension winding.

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convey heavy materials at fast feeding rates through extra long trough. Various models offer feeding capacities ranging from 25 to more than 1,000 tons/hr. in dry materials weighing approx. 100 lbs/cu. ft. Circle No. **114.**

Skin Packaging

Print-A-Tube Co. has developed a new process of skin packaging that increases production line speed, eliminates adhesives, and reduces film thickness. A current data sheet includes a comparative table of advantages of this process compared with previous methods. Circle No. **115.**

Hermetically Sealed Overwraps

Aluminum Co. of America has published a folder describing the Pacon Process, which solves the need for adhesive on the foil side of a foil-paper lamination for overwrapping. It permits all metal-to-metal areas to be sealed as well as the necessary metal-to-paper areas on the long side-seam and at the end-folds of the package. The resultant seals provide a barrier to water vapor transmission, gas transmission, infestation, etc. A description of the necessary machinery and an outline of the technique of application is concisely presented. Circle No. **116.**

Wide Label Moisteners

Seal-O-Matic Dispenser Corp. has a catalog on its line of wide label moisteners. Included are details on the **4" and the 6" Label Masters.** These moisteners feature rust resistant water boxes, stainless steel covers, and pure bristle brushes. Circle No. **117.**

Tablet Inspection Belt

The Burnet Co. offers information on its tablet inspection belt, the Triumph. This belt permits visual inspection of both sides of a tablet at the approx. rate of 200,000/hr. A sifting device helps remove dust and chips coming from uncoated tablets. Tablets are fed on a green plastic faced belt where one operator inspects one side; then the tablets turn over and return on a lower belt for inspection on the other side. Circle No. **118.**

Packaging Table For Conveyor

J. B. Dove and Sons, Inc., has further information on its Electro-Sealer packaging table for conveyor systems. The Model PT-48 packaging table can be installed three ways. It can be top mounted across a refrigerated well, it can be side mounted (using special legs), or it can be set up as an individual packaging station. It is designed for use in supermarkets with "production line" refrigerated conveyor systems. Circle No. **119.**

Web Guide Control

The North American Mfg. Co. has published Bulletin 2-001. This bulletin describes a web guide control system controlled by the Hague hydraulic relay. The relay operates on the hydraulic jet principle with a completely sealed and pressurized hydraulic power circuit (50 to 750 p.s.i.) which permits installing the relay in any position or location with respect to the hydraulic pump and reservoir. The control uses a non-contact method of edge detection which can be applied to such films as polyethylene, as well as such materials as heavy steel strips. Circle No. 120.

Elevating Feeder

The Lakso Co., Inc., offers a circular on its Model 54 elevating feeder for tablets and capsules. Model 54 features separate belt and buckets for easy cleaning; hinged hopper; changeable feed screens for varying size tablets, and variable feed rate which automatically controls the feed. Circle No. **121.**

Temperature Controller

Illinois Testing Laboratories, Inc., has issued Bulletin No. 3885 describing its "Alnor" Pyrotroller. This instrument is a pyrometer controller, which means that it can be applied wherever a thermocouple can be used to measure temperature. The Pyrotroller is a compact instrument, requiring only one-third of a sq. ft. of panel space. Circle No. **122.**

Automatic Web Splicer

Butler Automatic Machine, Inc., offers an illustrated folder with specifications and operating details of an automatic web splicer. Adaptable to almost every type of leading overwrap machine, this unit automatically feeds wrapper rolls in a continuous flow with precision registration. Circle No. **123.**

Sorting And Counting Unit

Post Machinery Co., Electronic Products Div., has released a data sheet on its high-speed sorting and counting machine, Model FCB-1. Designed primarily for small parts counting and batching, the unit is capable of feeding small parts at rates from approximately 300 to 1,000 pieces/min. In operation an adjustable channel located above the moving conveyor belt separates the parts to be counted so that they individually pass by the photoelectric sensing device. At the preset count (if preset counter is used), a rotary solenoid connected to a mechanical gate in the batcher operates to deflect the flow or release the accumulated count. Circle No. **124.**

Individual Label Design

Allen Hollander Co. has released a kit with which anyone can design his own labels. Called the Design-It-Yourself Label Kit, it contains detailed step-by-step instructions for designing labels with a wide choice of standard borders, shapes, type styles and color combinations. A total of 41 different border designs are illustrated in actual size and color. Examples of good label design and a seven step checklist are included. Circle No. **125.**

Plastics Inserts For Machinery

Research Sales, Inc., offers information on wheels and capper inserts made from P-400 compound, a plastic material. Advantages claimed for parts made from this material include no marring of decorative closures; more efficient closing because of greater friction coefficient, and less downtime because the material outlasts rubber 15 to 1, according to Research Sales. Parts can be custom-made to suit individual requirements. Circle No. **126.**

Top/Bottom Imprinter

Cozzone Marking Co. offers information on its recently-developed Top 'n Bottom Coder-Printer. This fully automatic machine imprints code numbers, dates, or price marks simultaneously on container tops and bottoms during high-speed packaging operations. Up to 400 top and

SYNTRON HOPPER LEVEL SWITCHES

automatically maintain desired minimum and maximum level of materials in hoppers and bins.

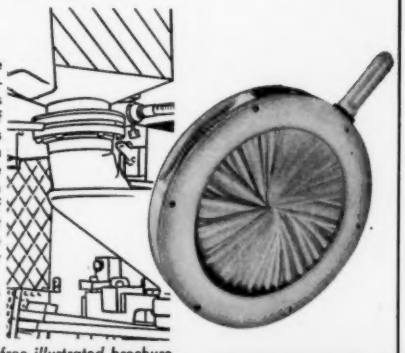
The new design and sturdy construction of Syntron Diaphragm Hopper Level Switches permit automatic volume control not only with dry, fine powder materials but also coarse, granular materials. They maintain the desired material level in bins and hoppers by automatically starting and stopping material supply feeders.

SYNTRON Hopper Level Switches are furnished with neoprene or stainless steel diaphragm depending on materials to be handled.

Easy to install, easy to maintain.

SYNTRON FLOW CONTROL VALVES

positive flow control and shut-off of bulk matrials from bins and hoppers



SYNTRON Flow Control Valves are designed to provide a clog-free, positive control of materials flow from bins and hoppers. The principal feature of this manually operated flow valve is the flexible diaphragm which forms a concentric aperture — which may be opened to any desired flow position and held against the head load of material and closed completely without jamming or clogging. They are easy to install. Flexible diaphragm can be easily replaced at low cost.

Our application engineers will submit complete information upon request.

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Other SYNTRON Equipment of proven dependable Quality

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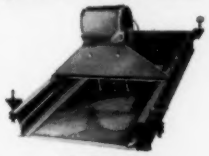
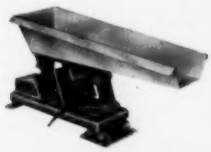


VIBRATING SCREENS

VIBRATORY PACKERS



VIBRATORY FEEDERS

PARTS FEEDERS

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★ GUMMED TAPE IS LOW IN COST

★ GUMMED TAPE IS THE ONLY DUST, DIRT, AND VERMIN-PROOF CLOSURE

★ GUMMED TAPE GIVES FAST, SURE SEALING

★ GUMMED TAPE IS EASY TO USE NO EXPENSIVE EQUIPMENT

★ GUMMED TAPED CARTONS ARE RE-USABLE

Your paper merchant has exactly the right gummed tapes for you.

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Suppliers of Animal Bone Glue to Gummed Tape Manufacturers

bottom imprints/min., depending on container size and shape, can be made with the unit. Circle No. **127.**

Cosmetic Products Filler

Popper & Sons, Inc., makes available a data sheet on its Perfektum Ampfil Model F-400X, a filler designed to handle small containers from 1 cc to 1 oz. The unit features stainless steel contact parts and specially designed 1 gross rack or handling plates. It is useful for filling such products as aerosols, colognes, creams, emulsions, lotions, etc. Circle No. **128.**

Release Coating

Dow Corning Corp. has a 4-page bulletin on its Syl-Off silicone antiadhesive. Syl-Off paper coatings impart release characteristics and water repellency to kraft, glassine, parchment, multiwall bag liners, boxboard, plastic film, and other packaging materials. Syl-Off is said to be permanent, non-contaminating, and non-migrating. Circle No. **129.**

Milk Carton Filler

Crown Cork & Seal Co., Inc., offers information on the Crown 10 filler designed especially for filling milk containers. It has a capacity of 100 qts/min. and can handle a variety of sizes. 5 min. changeover and 30-min. clean-up are claimed for this unit. Circle No. **130.**

Molded Corrugated Packaging

Pillo-Pak of New England, Inc., has an information sheet on its Spring-Pak protective packaging. Spring-Pak is a continuous sheet of molded corrugated paper, available in a variety of forms and applications. It is said to approximate the protective resilience of sponge rubber. Samples and prices are available. Circle No. **131.**

Automatic Packaging Equipment

Mercury Heat Sealing Equipment Co. has a 6-page brochure describing its line of automatic packaging machinery and equipment. Included are pictures and specifications for its Verti-Pak unit, as well as label sealer, portable conveyor and accumulating table, bag sealer, Strip-O-Matic, Flat-Pak, etc. Circle No. **132.**

Low Static Styrenes

Monsanto Chemical Co. has released a technical service bulletin summarizing the properties of its low static styrenes. The bulletin describes Lustrex Lo-Stat formulations which can be injection molded into products said to be virtually lacking in electrostatic charges. Electrical, mechanical, and thermal properties, molding and post-molding operations, and the theory of how injection molded styrenes acquire and retain electrostatic charges are discussed in the bulletin. Circle No. **133.**

Weigher-Bagger

Bemis Bro. Bag Co. offers Bulletin No. 1510 illustrating its Fastr-Weigh bagger for pelleted, granular, and cubed-type products. The bulletin contains engineering data and details on operational performance of the bagger which weighs and fills up to 22 50-lb. bags/min. The unit features a self-cleaning, self-aligning knife edge, and self-cleaning

scale beam to assure weight accuracy within 2 oz. Circle No. **134.**

Can Sorters, Uncasers

Atkron, Inc., has an 8-page file size brochure on its Dumore automatic can sorters and uncasers. The bulletin explains and illustrates the magnetic principle employed in these units to automatically uncase, align, and orient for filling a variety of cans, whether in reshipper cartons, shipper trays, bags, or bulk. Circle No. **135.**

Package Opening Device

The Dobeckmun Co. has released a sample brochure on its Zip-Tape package opener. The brochure contains samples in the complete range of colors and gauges available, as well as a guide for size, type and lineal inches per pound for each of the standard tapes. Circle No. **136.**

Weighing & Filling Machine

The Trescott Co., Inc., has a data sheet on its Trescomatic Model "B" weigher and filler. This machine is electronically operated and is guaranteed to within 1/16 oz. accuracy. For use with granular and small parts products, the machine has a weighing range of from 1 oz. to 6 lb. Circle No. **137.**

Label/Tag/Ticket Imprinter

A. Kimball Co. has available a folder describing three Roto Kimco models for imprinting labels, tags, or tickets automatically. Typical labels handled by these units are illustrated and specifications are included. Circle No. **138.**

Reinforced Gummed Tape

Ludlow Papers, Inc., offers a 4-page folder on its Comet Snake Tape—a Fortisan reinforced tape used in carton sealing. Illustrations show labor saving advantages claimed for tape, as well as its various uses, Circle No. **139.**

Case Feeder

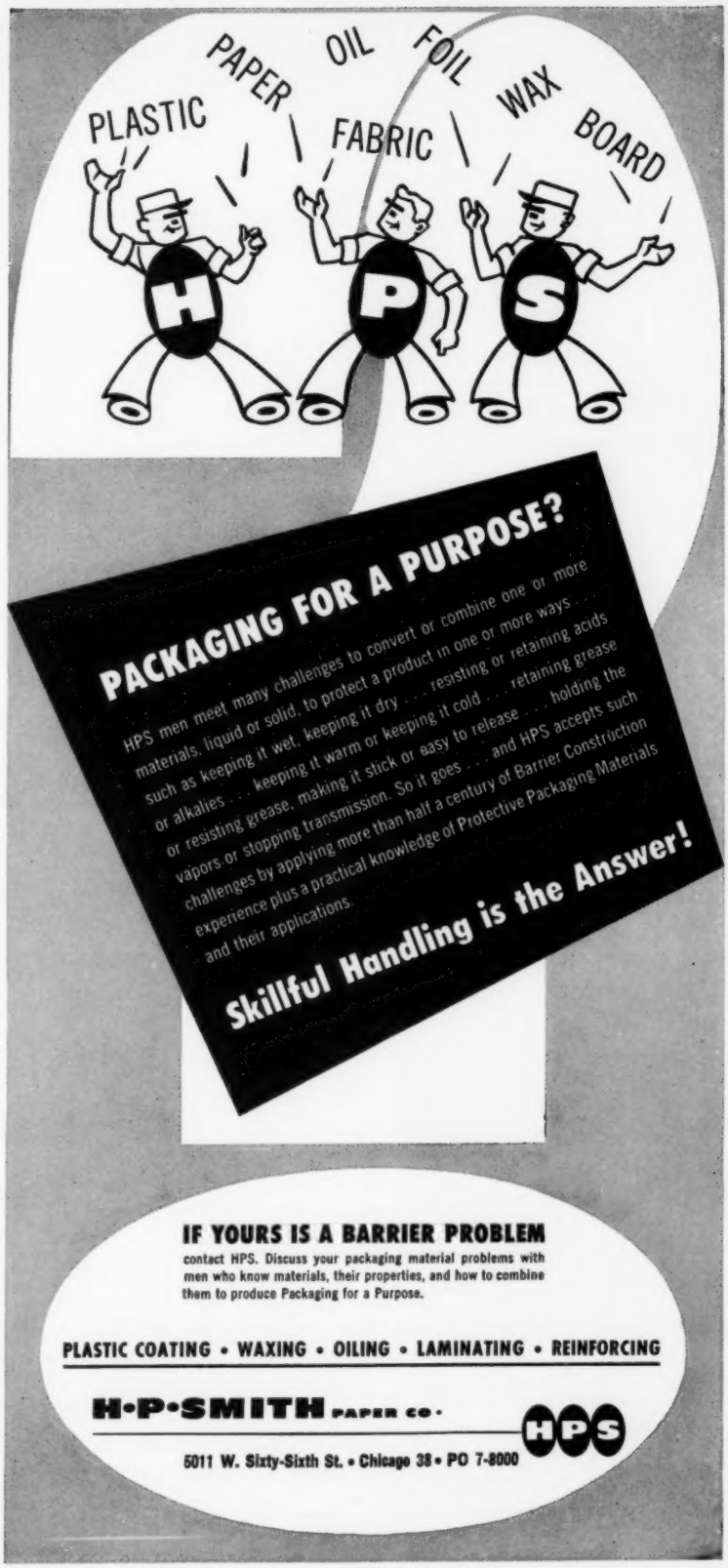
Emhart Mfg. Co.'s Portland Div. (formerly Standard-Knapp Div.) has an information sheet on the Model 840 case feeder. The bulletin describes the feeding, positioning, cushioning, and flexibility of the machine. Included are specifications and a line drawing of a Model 840 case feed floor plan. Circle No. **140.**

Thermal Impulse Sealer

Vertrod Corp. offers a 12-page brochure illustrating the advantages of thermal impulse heat sealers, including types of film sealable by this process. Models of a number of such units are pictured and dimensions given. Current prices are included. Circle No. **141.**

Pail Printing

Bennett Industries, Inc., has a data sheet on the Chapco Print-A-Can printer, a machine for printing five gallon pails at rates up to 500 pails/hr. Pails with open or closed heads, with or without rolling hoops can be accommodated. Equipped with casters, the machine is portable and can be rolled to the pails conveniently. Rubber printing plates are used and operation is mechanical requiring no electric or air power. Circle No. **142.**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Structural design notes for corrugated containers

Tensile strength of paperboard

Note No. 1

By K. Q. Kellicutt,
Engineer,
Forest Products Laboratory,
Forest Service,
U. S. Department of Agriculture,
Madison, Wisconsin

To extend the utility and usefulness of the corrugated shipping container, the Forest Products Laboratory has developed structural design criteria with which strength requirements can be specified to meet specific use conditions. To do this with any degree of accuracy, the fundamental mechanical and physical properties of the *component* paperboard sheets used in the corrugated *structure* must be known. And these, in turn, could only be worked out after testing techniques had been developed that would yield the information necessary to evaluate the paperboards.

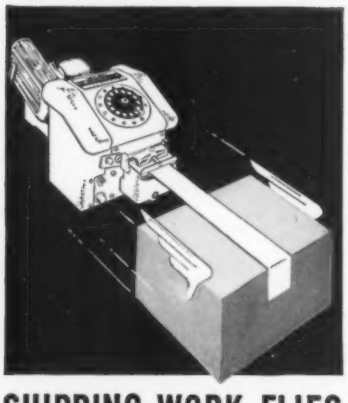
Tension Tests Of Paperboard

The late T. A. "Tac" Carlson reasoned that an evaluation test needed to be one that would yield more information than a single value, such as maximum breaking strength. After considerable study, he developed a testing technique that would show the stress-strain relationships for use in studying the component sheet materials (*1*). His highly precise technique made use of a Tuckerman optical strain gage as a means of measuring the stretch of 1 x 6-in. paperboard strips.

The stretch could be measured to 4×10^{-6} in., and the load required to cause the elongation, applied through clamps of a testing machine, could be read to tenths of a pound. From these data, it was possible to determine or calculate the **stress at proportional limit, the stress at maximum load, and the modulus of elasticity of the paperboards.**

Vance Setterholm, in recent studies of strength properties of paper and paperboard at the laboratory, designed and developed a simple gage for measuring elongation of paper strips. He made use of the principle employed in the optical lever system of the Marten's mirror extensometer in devising the gage (*2*). It is held to a paperboard specimen by means of pivoted magnets that are suspended on knife edges, making it relatively easy to set the gage. As with the Tuckerman, the actual elongation of the specimen is measured.

With either gage, satisfactory results can be obtained. Both gages are shown in Fig. 1 superimposed on plottings resulting from data derived from their use.



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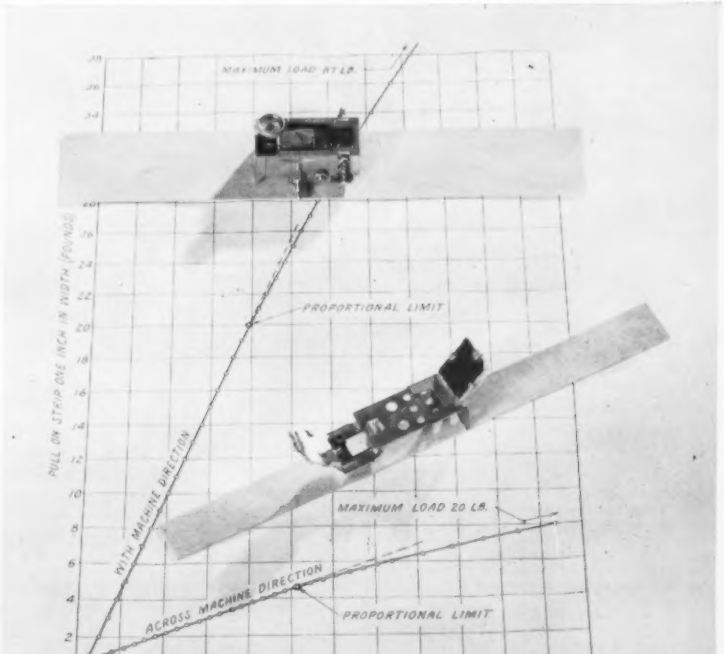

Fig. 1. Typical load-elongation curves, derived from tension tests of paperboard in machine direction and across-machine direction. Tuckerman gage is at top; Setterholm gage between two curves.

Tensional Strength Properties Of Paperboard

The modulus of elasticity (commonly represented by the symbol *E*) **is one of the most significant properties used to correlate the physical properties of the sheet material with those of the corrugated board.** It is indicated by the slope of the straight-line portion of the two typical curves for a paperboard liner shown in Fig. 1. It may be calculated by dividing any value of stress, selected from the straight line, by the corresponding value of strain. This physical property, it may be shown, is directly related to stiffness.

When corrugated board is subjected to bending loads either as a beam or a column, the resistance to buckling increases directly as modulus of elasticity increases. Hence, the higher the *E* of the components, the stiffer the board; and, in turn, the more rigid is the box and the greater its resistance to crushing forces.

The proportional limit is also indicated on these curves.* It is the point on the plotted line where these series of points depart from a straight line. **Although the proportional limit value may be less important than the modulus of elasticity, it needs to be considered.** For example, containers fabricated from corrugated fibreboard made from components having a high proportional limit are better able to withstand repeated stresses than those made from materials with a low proportional limit. This will be discussed in more detail in subsequent notes.

Ideally, paperboard would have isotropic strength properties, but boards currently used do not. The extent of the difference between the values for its two principle directions becomes obvious with the tension test. The strength (Fig. 1) for the across-machine direction of the sheet shown is relatively low in comparison to that in its other principle direction.

Boxes made from components having similar characteristics would be weak in top-to-bottom compression and along the horizontal scores, but the vertical score lines would be strong and the resistance to crushing would be relatively high when the force was applied in the end-to-end or side-to-side direction of the box. Sheets having more nearly the same strength characteristics in both directions provide a better balance of container strength. Some typical physical strength values of a variety of paperboards are given in Table I.

TABLE I

Typical Tension Test Values Of Paperboard

Description of Paperboards			Tensile Properties			
Name	Weight of 1,000 sq. ft. (lb.)	Thickness (in.)	Grain direction (machine)	Stress at proportional limit (lb/sq. in.)	Stress at maximum load (lb/sq. in.)	Modulus of elasticity (lb/sq. in.)
CORRUGATING:						
Chestnut chip.	29	0.0099	With	1,140	2,754	496,200
			Across	411	1,421	184,150
Steamed pine groundwood..	29	0.0103	With	1,168	3,665	557,250
			Across	232	1,000	111,550
Straw	34	0.0097	With	754	2,046	458,690
			Across	304	1,014	156,315
LINERS:						
Jute.....	64	0.0157	With	1,183	5,422	1,104,750
			Across	334	1,604	190,350
Filled kraft...	62	0.0163	With	1,171	6,264	919,550
			Across	241	1,463	166,962
Fourdrinier kraft.....	42	0.0167	With	828	3,728	609,862
			Across	468	2,484	325,950
Fourdrinier kraft.....	47	0.0167	With	896	3,819	568,968
			Across	447	2,883	331,356
Fourdrinier kraft.....	68	0.0224	With	756	3,610	534,281
			Across	408	2,827	314,144
Jute.....	87	0.0259	With	731	4,078	545,891
			Across	184	1,195	118,694
Jute.....	109	0.0316	With	929	5,519	770,813
			Across	200	1,310	135,270
Fourdrinier kraft.....	85	0.0322	With	664	3,260	545,291
			Across	376	2,431	305,362

Literature Cited

(1) Carlson, T. A., "A study of corrugated fibreboard and its component parts as engineering materials," *Fibre Containers*, 1939.

(2) Setterholm, Vance C. and Kuenzi, Edward W., *Method for determining tensile properties of paper*, (Forest Products Laboratory), Report No. 2066.

* Any elastic material, if stressed to any point below its proportional limit, will suffer some change of shape or dimension but will return to its original shape when the stress is removed. However, if it is stressed beyond its proportional limit, a permanent change in shape is likely to result.

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Polyurethane foam protects delicate precision instruments

(*Continued from Page 38*)

We found that there was a definite need of a portable carrying case for a microscope in addition to the conventional storage cabinet. This was to be used by students who owned their own instrument, and by professional people requiring such portability. How to cushion the item to withstand normal impact and shocks, which are inevitable from such handling, was the problem. With the design of the plastic case worked out, we turned to polyurethane foam for the cushioning material. (See Fig. 4)

Has ample shock protection. After much experimentation, we determined that a solid layer of foam, ¼ in. thick, was sufficient to use on the bottom of the case. It provides ample shock protection to the instrument which rests directly on it. Incidentally, we found that "heel stock" (the outer layer of the foam after it is formed) was ideal due to its density being slightly higher than that of normal foam.

To prevent the instrument's shifting from side to side during handling, another layer of foam ¾ in. thick is glued to the bottom layer. The center of this second layer is die-cut to fit the base of the microscope. It is a simple matter to insert and remove the instrument with this arrangement. This second layer also contains various other die-cut holes for accessories such as extra objectives, eyepieces, and so on. Regular foam, not heel stock, is used for this layer.

For approximately two and one-half years, we have been using polyurethane foam in packaging our many delicate instruments. It is used in several different ways as described in this article. To date, we have had no damage to any instrument shipped with foam as the cushioning material. Reduced costs of packaging materials, elimination of all damage, standardization of packaging components, and increased packaging efficiency have all resulted in substantial annual savings plus improved product quality. (*End*)

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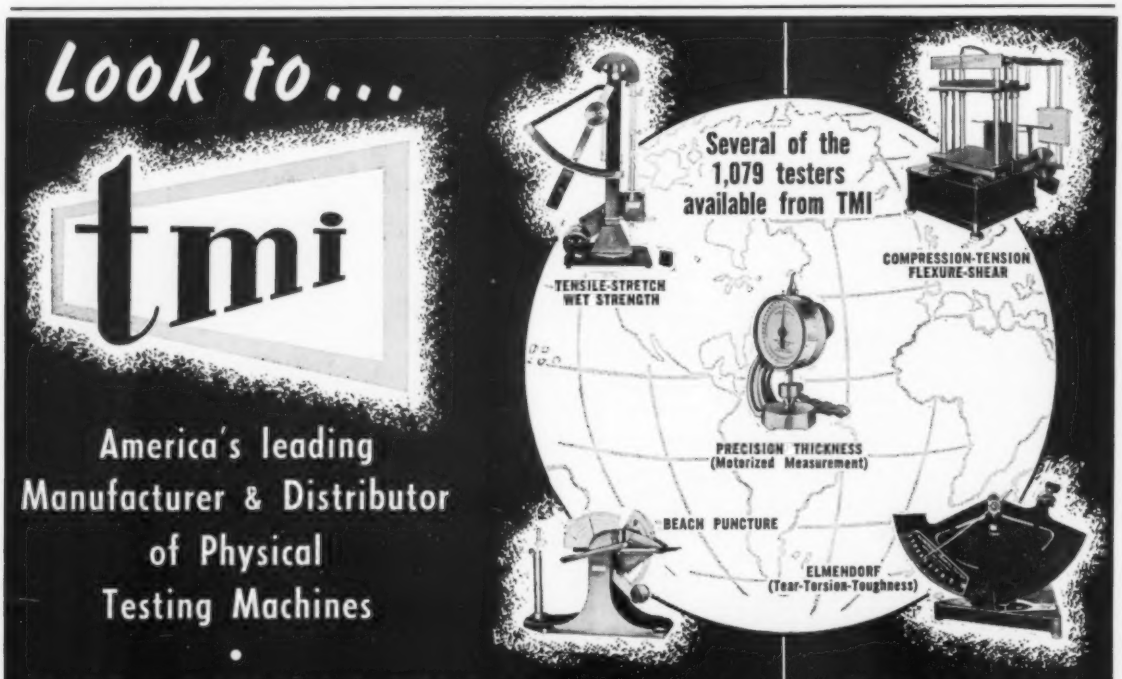
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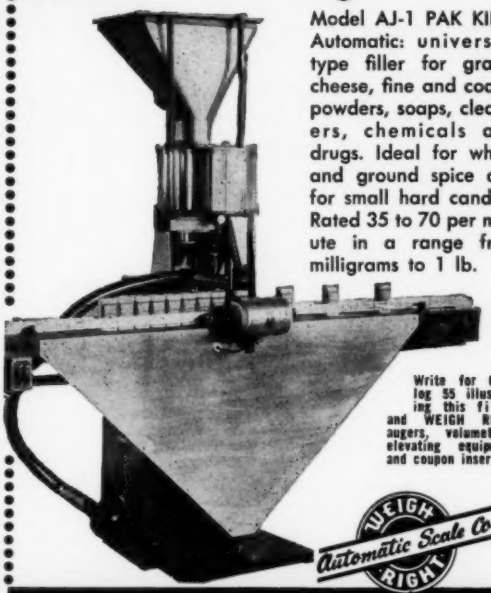

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Prepare now to meet tomorrow's education, management needs

Today's standards of professional attainment and technical competence will be woefully inadequate tomorrow. We must recognize this fact and step up our preparation for tomorrow's demands. We shall need more than a mere upgrading of education and an improvement of day-to-day performance. Several trends already indicate that this "tomorrow" means major changes in our approach to education and in the way we do many of our daily jobs. The growing importance of technical and operational packaging in a company and the recognition of it mean that packaging people will be very much involved in new activities.

General dissatisfaction with current educational methods is not confined to packaging. Educators and industry people alike call for its improvement. Terming our educational system "obsolete," one distinguished expert, Margaret Mead, has challenged *industry* to play a bigger part in education. Her point is that you no longer send someone through college and then turn him out as "educated." Rather, we can expect to find education a continuing thing—given or taken from time to time during one's life.

Education spread out over a lifetime

This means more than the kind of adult education we now have in the packaging field. Rather, it means letting our specialists take courses and programs at various times, whenever the company and the individual find it mutually beneficial. Those who expect to manage the packaging function during the coming years had better plan on figuring out how to spare key men for weeks or even months at a time while they absorb new education.

In urging attention to this direction of change in education, we recommend noting some of the trends developing in business management itself. For example, packaging experts should take a look at the growing body of "information technology." We refer to the systematic use of quantitative decision-making by computer techniques and similar mathematical methods. Not many user company packaging specialists are currently involved with information technology, but we think they should start preparing for it. Progress it is making in other areas of the company structure suggests its usefulness to the packaging function.

Top management hopes to reduce the guesswork in its decisions by using these new techniques to develop, synthesize, and interpret data for decision-making. However, this does not relieve a top manager of basic responsibility for sound decisions but rather enlarges his capabilities by giving him information far more quickly than he can get without these techniques.

Indications are this will mean quite a bit of shaking up in the middle management area. More jobs will be *programmed* than ever before. Inevitably some will be downgraded because of there being less room for individual judgment after programming. Others are likely to be upgraded for the same reason. More and more "information technology specialists" will move into key spots—perhaps as assistants to presidents.

We must set higher goals, then surpass them

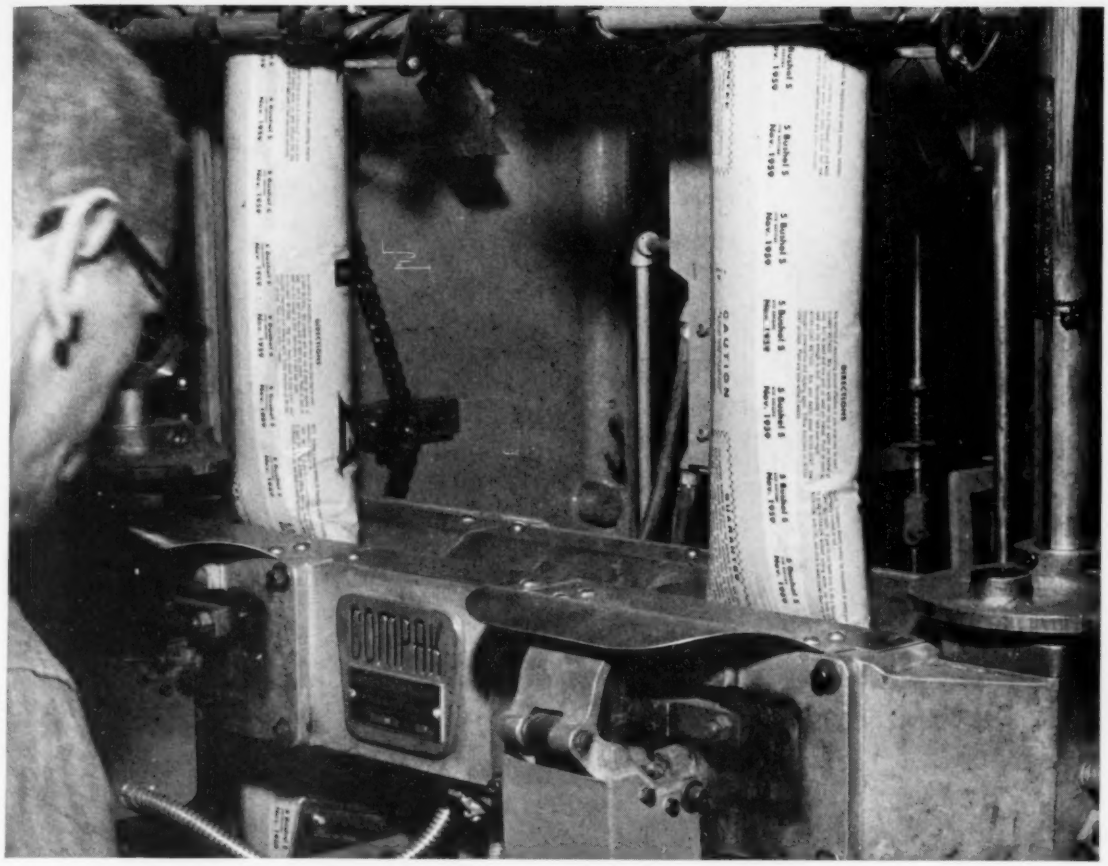
Most of us are so engrossed in the amazing details of technical and operational packaging that some of these broader developments in education and business management escape our scrutiny. It is time we examine them.

Packaging education will improve. Further, we can expect more of it. Our pioneering Michigan State program will have company. Other institutions will offer undergraduate training in packaging. Channels for the professional development of a young packaging man after he joins a company must improve. Organizations and societies will upgrade their programs. (We have no quarrel with what these groups have done to date. We are merely saying that more people need to spend more time thinking about how much better these programs must be tomorrow).

In education, in business generally, and in packaging specifically, there are people of vision who would alert us to what is ahead and help us prepare for tomorrow. If the packaging function is to rise to the dominant role it deserves, we must act on what these prophets tell us.

Bruce Hollingsworth

Editor



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